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AUTHOR Dexter, Genevie
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ABSTRACT

The Physical Performance Test for California is a revision of the publication prepared in 1966 by a committee representative of the offices of the county superintendents of schools. The test events which compose the Physical Performance Test were studied, and new norms were established during the 1969-70 school year. This publication contains the description of each test event designated by the California State Board of Education in 1970. Also included are directions for test administration, conducting each test event, recording and reporting scores, and for using test results. (Author/AG)

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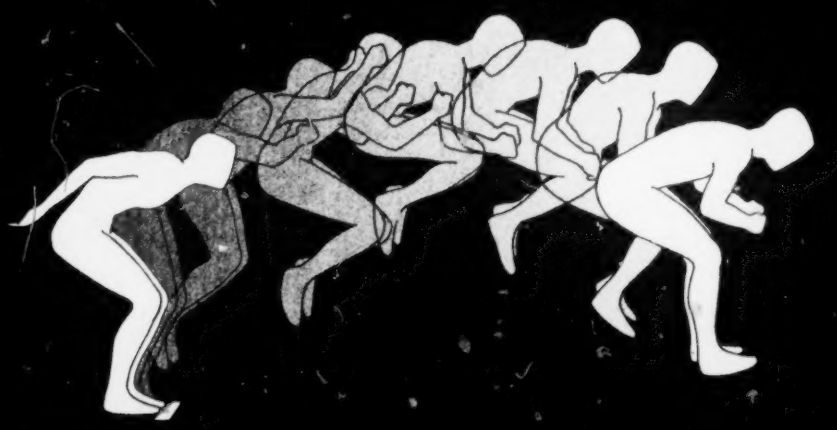

The Physical Performance Test for California (Revised)

CALIFORNIA STATE DEPARTMENT OF EDUCATION
Wilson Riles, Superintendent of Public Instruction, Sacramento, 1971

EDO 58272

The Physical Performance Test for California
(Revised)

Compiled for the
Bureau of Physical Education, Health Education,
Athletics and Recreation
Division of Instruction

By
Genevie Dexter
Consultant in Physical Education

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FOREWORD

The children and youth of today who will shape the world of the future are faced with an ever increasing need for the development of interests and skills in a variety of physical activities. A constantly changing environment requires their acquisition of physical stamina and their understanding and application of the many aspects of physical activity. The necessity of vigorous physical activity for children and youth is evidenced by the demonstrated relationship of physical performance to total achievement, inactivity to obesity, and fundamental skills to the worthy use of leisure.

Teachers of physical education must provide daily vigorous activity which stimulates imagination and creativity as well as physiological development and behavior. Thus, a well-planned physical education program which provides a balance of activities helps prepare pupils to adjust successfully to changing conditions whenever they may occur.

Educators, especially those involved with physical education in California, have approved physical performance testing as one means of identifying pupils' physical needs. The results of such tests must be used to modify and improve the physical education program if optimum individual growth and development are to be achieved.

The achievement of that growth and development will make a major contribution toward preparing the children and youth of California to live adequately in this complicated world.

Wilson Riles

Superintendent of Public Instruction

PREFACE

The Physical Performance Test for California is a revision of the publication prepared in 1966 by a committee representative of the offices of the county superintendents of schools. The test events which compose the Physical Performance Test were studied, and new norms were established during the 1969-70 school year. This publication contains the description of each test event designated by the California State Board of Education in 1970. Also included are directions for administrating, conditioning, reporting, and using the results of the test events. This publication should be of assistance to governing boards of school districts in establishing policies for conducting physical performance tests in their districts, to administrators in implementing the policies established, to supervisory personnel in evaluating the testing procedure, and to teachers in administering the Physical Performance Test.

A designated single battery of six physical performance test events was adopted by the California State Board of Education in January, 1966, for use by school districts in California beginning in the school year 1966-67 to test pupils on certain aspects of their physical performance. Previously, school districts chose a physical performance test from a list of three approved tests. The members of the committee that prepared the 1966 publication were: Donald G. Bornell, Consultant, Physical Education, Los Angeles County; Ted H. Hucklebridge, Consultant, Physical Education, Recreation, and Safety, Sonoma County; James W. Leathy, Jr., Coordinator, Physical Education, Health Education, and Safety, San Bernardino County; and Evelyn M. Taix, Coordinator, Elementary Programs, Santa Cruz County. Arthur E. Hawkes, formerly Director of Health, Physical Education and Youth Services, Los Angeles County, was chairman of the committee in 1965-66 and in 1966-67.

During the 1969-70 school year, funds available under the Elementary and Secondary Education Act, Title V, were approved for the purposes of studying the test events which had been designated each year since 1966, recommending new test events, and developing norms for them. Six specialists in testing and research reviewed the criteria for the selection of the test events for the study. The specialists were: Herbert deVries, Professor of Physical Education, University of Southern California, Los Angeles; Anna S. Espenschade, Professor Emeritus, University of California, Berkeley;

Fred Kasch, Professor of Physical Education, San Diego State College; Carl Klafs, Professor of Physical Education, Long Beach State College; Ernest Michael, Associate Professor, Physical Education, University of California, Santa Barbara; and Dorothy Mohr, Professor of Physical Education, Sacramento State College.

Ten coordinators were appointed to work with the specialists in developing common procedures for test administration and in providing inservice education for personnel who administered the test events to a sampling of boys and girls. The coordinators were: Mrs. Marian Anderson, Professor Emeritus, University of California, Santa Barbara; Donald Bornell, Consultant in Physical Education, Los Angeles County; Paul Hillar, Assistant Superintendent, Auxiliary Services, office of the Stanislaus County Superintendent of Schools; Ted H. Hucklebridge, Consultant in Physical Education, Recreation, and Safety, Sonoma County; James W. Leathy, Jr., Coordinator, Physical Education, Health Education, and Safety, San Bernardino County; Mrs. Evelyn Logan, Coordinator, Health, Physical Education, and Outdoor Education, Monterey County; Roy Mangini, formerly Consultant in Education, El Dorado County; Louis Mozzini, Coordinator of Physical Education and Health Education, Alameda County; Jack Murtha, Consultant in Physical Education and Outdoor Education, Sutter County; and Jack Price, Curriculum Coordinator, San Diego County, assisted by Asahel E. Hayes, Consultant in Physical Education, San Diego Unified School District.

EUGENE GONZALES
Associate Superintendent of Public Instruction; and Chief, Division of Instruction

JOHN J. KLUMB
Acting Chief, Bureau of Health Education, Physical Education, Athletics, and Recreation

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CHAPTER I

Introducing the Physical Performance Test

Testing for physical performance has been developed to assist personnel in the public schools in determining the extent to which the physical education program is successful in meeting one of its major objectives – "to develop and maintain the best possible level of performance, understanding, and appreciation for physical fitness to meet the demands of wholesome living and emergency situations."[1] The Physical Performance Test, comprising six test events, was adopted in 1970 by the California State Board of Education and designated for use in the public schools.

The primary elements of physical performance which are necessary for the progressive physical development of boys and girls, ages ten through eighteen, are embodied in the six test events. The primary elements of physical performance which are measured by the test events follow: leg strength and power; abdominal strength and endurance; agility, balance, and coordination; upper body and arm strength and endurance; and cardiorespiratory endurance.

The selection of the designated Physical Performance Test was based upon the criteria which follow:

- Involvement of some of the natural skills of human beings (running, jumping, and climbing)
- Inclusion of some measure of cardiorespiratory endurance
- Involvement of a minimum amount of equipment
- Administration geared to teachers with a minimum of experience
- Administration which requires a minimum amount of time

If the designated Physical Performance Test is to be used effectively to bring about an improved physical education program beneficial to each boy and girl, ages ten through eighteen, the teacher and the pupil must understand certain concepts as presented in this publication. This publication was designed to help the teacher do the following things:

- Understand that physical performance is only one of the objectives of physical education.
- Recognize that the designated Physical Performance Test should not be given to children who are younger than ten years old.

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[1] *Physical Education Framework for California Public Schools, Kindergarten Through Grade Twelve (Tentative).* Sacramento: California State Department of Education, 1969, p. 7.

- Understand the purposes of physical performance testing as they apply to the individual pupil and to the physical education program.
- Realize that identification of physically underdeveloped pupils is the first reason for administering the Physical Performance Test.
- Agree that changes in methods of instruction or units of instruction or both must be offered to remove conditions that permit a pupil to be physically underdeveloped. See page 3.
- Understand that the progress of a pupil as shown by the raw scores of the second testing period, when compared with the raw scores of the first testing period of the school year, is the most important information gathered concerning a pupil's achievement in physical performance. See page 3.
- Know exactly how to organize pupils to administer each test event efficiently and effectively. See Chapter II.
- Know exactly how each test event is performed in accordance with the rules and teaching suggestions in order to bring about valid and reliable test results. See Chapter II.
- Know how to use the test results for improvement of pupils' physical performance and of the total physical education program in order to bring about desired change. See Chapter IV.
- Know the legal basis for testing in the Education Code and the California Administrative Code, Title 5, Education, in order to administer the designated Pnysical Performance Test at the proper time.

Purposes of the Physical Performance Test

The Physical Performance Test is used to secure *some* of the information needed to accomplish the following purposes:

- Identify physically underdeveloped pupils.
- Adapt instruction to individual needs.
- Adapt the physical education program to pupils' needs.
- Appraise pupils' progress.

Each purpose is involved in and related to the total learning situation and to the availability in the school of certain services. To identify physically underdeveloped pupils, the teacher must do or be assisted in doing the following:

- Analyze the results of physical examinations given by physicians.
- Evaluate the pupils' growth patterns, comparing height and weight of the individual with those listed in standardized growth charts or grids.
- Appraise the pupils' body balance and movements or stationary and moving postures.
- Determine pupils' performance levels according to the percentiles on pages 54 through 65.

To adapt instruction to meet individual needs, the teacher must do or be assisted in doing the following:

- Change the emphasis in instruction from some activities to others which will remove certain deficiencies; for example, spending more time on arm strength activities if a girl cannot perform ten chair push-ups.
- Teach to develop understanding of how the body moves.
- Change length of units of instruction and amount of time spent on conditioning activities.
- Revise expectancy of the performance of pupils to a realistic level.

To adapt the physical education program to pupils' needs, the teacher must do or be assisted in doing the following:

- Determine whether the courses offered make it possible for pupils to develop a desirable level of physical performance.
- Determine whether the methods and emphases in the courses offered make it possible for pupils to maintain a desirable level of physical performance.
- Appraise the courses offered with respect to opportunity for *each* objective of physical education to be realized by *each* pupil.
- Understand the objectives sought and the methods for measuring the achievement of each objective by each pupil.

To appraise pupils' progress, the teacher must do or be assisted in doing the following:

- Utilize test results as only *one* means of measuring pupils' progress, as shown by improvement between the two testing periods in one school year.
- Measure progress and achievement in appropriate and specific skills by administering appropriate skill tests, such as in kicking, throwing, and swimming.
- Utilize rating scales for team play, rhythm patterns, and perfection of form.
- Obtain evidence of acceptable behavior in group activity.
- Obtain evidence of participation in worthwhile recreational activity.
- Utilize measuring devices for each specific goal stated for each unit of instruction.

Administration of the Physical Performance Test

Physical performance testing is an integral part of both the testing and the instructional aspects of the physical education program. To ensure an effective administration of the designated Physical Performance Test, leadership roles must be recognized and utilized by all concerned.

Roles of Leadership

The State Department of Education provides guidance and leadership at the state level by establishing policies regarding physical performance testing and by providing consultant services upon request.

The county superintendent of schools has certain responsibilities in helping school districts establish testing procedures to ensure validity and reliability. The consultant or supervisor in the county superintendent of schools office who has responsibility for physical education should serve as a resource person or provide coordination to school districts needing assistance.

The governing board in each school district establishes procedures regulating certain aspects of physical performance testing. The school district administrative and supervisory personnel provide leadership in administering the test events, interpreting the results, and providing inservice education.

The personnel in each school make provisions, through an adequate health program, for conducting essential health services and for developing health practices. School personnel should be informed about the capacity of each pupil to engage in strenuous physical activity through the use of the physician's report of pupils' physical examinations, daily observations, and health histories.

School personnel must provide a program of measurement and evaluation which makes possible the appraisal of the progress and achievement of each pupil in all aspects of learning. Testing for performance is one type of measurement which is used to appraise pupil progress, to identify those pupils needing special help, and to modify methods of instruction and courses offered.

School personnel must provide each pupil with the assistance he needs to understand why these test events are important to him, what the results mean individually, and what can be done to remove the weaknesses discovered. Each pupil participating in these test events should benefit from an improved physical education program as units of instruction for an individual or group are developed or revised and facilities are acquired.

Procedures for Administration

Optimum results from physical performance testing are most likely to be achieved when informed school district personnel are assigned the responsibility of coordinating the administration of the tests.

In a small elementary school or high school district, the coordination may be assumed by an administrator or assigned to a teacher who has had some background in testing or in physical education.

In a large school district, the role of coordinator may be assumed by a consultant in physical education, a curriculum director, a research assistant, or a principal.

In a unified school district, the physical education consultant or head of a physical education department may be the coordinator.

The extent of the improvement in the physical education program resulting from the administration of the Physical Performance Test is closely related to the understanding of its coordinator and the effective measures he applies toward such improvements.

Roles of Coordinator and Committee

The coordinator of physical performance testing should familiarize himself with the laws and regulations governing the designated test. He should assume a leadership role in organizing school personnel to help them conduct this testing program, and he should establish a committee to assist him in developing procedures for the administration of the Physical Performance Test. In addition the coordinator should provide leadership to the committee in its responsibility for utilizing the results of the test events in order that methods of instruction and units or courses are changed to assist in removing certain conditions identified by the results.

The committee should have the following responsibilities:

- Designation of the times during the year when the test should be administered. Fall and spring are recommended times.
- Determination of the grades in which the test should be given. Grades five through twelve are recommended.
- Development of procedures and forms for recording results in order to be able to utilize results as soon as possible.
- Development of forms and procedures for reporting test results and recommendations to the governing board of the school district for its approval.
- Proposal of the budget necessary to administer the test so that reliable results may be obtained.
- Suggestions for program revision based on the results of the test.
- Proposal of a plan of inservice education for teachers and administrators.
- Suggestions regarding procurement and use of necessary supplies and equipment and the designation and marking of testing stations.

The report to the governing board of the school district should be considered a part of the role of the coordinator and the committee responsible for physical performance testing.

CHAPTER II

Administering the Physical Performance Test

Reliable results of the Physical Performance Test depend upon close adherence to the instructions for conducting each test event. A complete description for administering each test event, pertinent teaching suggestions, common faults, and organization for administration are presented in this chapter for all who have responsibility for the testing.[1]

Preparation for Conducting Each Test Event

In preparation for conducting each event in the Physical Performance Test, grouping pupils, arranging supplies and equipment, establishing leadership roles, and conditioning pupils are essential procedures. The following questions frequently are asked about these procedures, and answers to the questions are provided:

Why should teachers group the pupils?

Grouping facilitates giving each test event and provides a desirable learning and testing environment.

How should teachers group pupils?

Groups should be small enough to allow for the efficient administration of each test, with a minimum of waiting time for each pupil.

Should the pupils remain in the same groups for all test activities?

It is not necessary. Some test events can be administered to pupils in groups of twos; others, in groups of threes; and still others, in larger groups. For example, pupils can work together in groups of twos as in the standing long jump; in groups of threes, in the knee bent sit-up for time; and in a group of ten, in the jog-walk. During practice and testing in such an arrangement, the teachers are free to supervise several groups.

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[1]The office of the Monterey County Superintendent of Schools has produced a film, "The Physical Performance Test for California, 1971," which illustrates each of the six test events. Proper techniques of performance and administrative procedures are demonstrated. The film is in color and is 20 minutes long. Approximate cost of the film is $95. An order blank and preview prints are available through the office of the Monterey County Superintendent of Schools, 132 W. Market St., Salinas, CA 93901 (phone: 408-424-0655).

What equipment and supplies are needed for giving the test events?

The chart which follows contains a list of the equipment needed at each testing station – an area appropriately marked and equipped for the designated test event.

Supplies and Equipment Needed at Testing Stations for Each Test Event

Test event	Supplies and equipment	Testing station
Standing long jump	10-foot measuring tape marker to designate distance jumped	Landing surface consisting of mats, turf, or outdoor rubber matting and a take-off line on floor or black-top or a takeoff board
Knee bent sit-up for time	Stopwatch	Clean floor, mat, or dry turf
Chair push-up	Chair, the seat of which measures 14 to 18 inches above floor *or* a secure bench	A wall against which feet may be braced
Side step	Stopwatch	Clean floor or clean asphalt surface with appropriately marked line
Pull-up	Metal chinning bar, which is 1¼ inches in diameter, does not rotate, and is high enough to allow pupils' feet to clear the surface when the arms are fully extended	Either indoors or outdoors wherever chinning bars are available
Jog-walk	Stopwatch	An accurately measured running track (See page 26.)

What is the role of the PRINCIPAL in the testing program?

The principal provides leadership, encouragement, inservice education, supplies and equipment, testing stations, and overall coordination of the testing program. He requests assistance with the testing program from the school district or county superintendent of schools office, if needed.

What is the role of the TEACHER in the testing program?

The teacher instructs the pupils, provides suitable conditioning activities, and organizes the class in such a way that each test event can be administered accurately and without causing pupils to become exhausted or to waste time.

What OTHER PERSONS may assist in administering the test?

Pupils with adequate preparation, teachers whose classes are scheduled at the same hour, and other persons with adequate orientation, such as teacher aides and student teachers, may assist in the administration of the test events.

Why must the teacher provide activities to condition each pupil before testing?

Because the physical performance test involves the natural skills of running, jumping, and climbing – skills basic to human movement – activities which help children develop such skills are fundamental to the physical education program. Consequently, instruction and practice involving these skills are a necessary part of the daily physical education instructional program.

In order that growing and developing children and youth may perform physical skills with no harm to themselves, it is essential that each pupil know exactly how to perform and be able to demonstrate his ability to perform each test event.

Elements of physical performance are interrelated and involve the whole person; therefore, in order to perform the test events in a correct and reliable manner, each pupil must have performed the test event previous to the day of testing.

How should the teacher prepare the pupils for the test?

In the weeks prior to the test, the major emphasis of the physical education program should be on the activities which develop those parts of the body used in the performance of each test event.

By gradually increasing the amount of effort exerted in performing such activities, the pupil's physical condition should be improved.

What is considered overemphasis of the test events or carrying on intensive preparation for the test?

Overemphasis and intensive preparation for the test events comprise the following:

- Practicing the test events during a major portion of the school year
- Retesting immediately following the administration of one or more test events (Unfavorable environmental conditions or some accident may cause such unreliable results that retesting should occur, but such a situation should be unusual.)

What preparations should the teacher make before giving the designated Physical Performance Test?

The same general procedures should be followed in preparing for the Physical Performance Test as in preparing for any other tests. Such procedures follow:

- Become familiar with the details and objectives of each test event.

- Explain to the class the purpose of the test and each test event.
- Organize the class in groups of appropriate size.
- Instruct the class in the correct procedure for each test event.
- Supervise the development of the correct procedure for each test event with each individual, and give him the opportunity to perform the test correctly.
- Ascertain that the testing stations are prepared and that the necessary supplies and equipment are available.

Why should physical performance testing be preceded by warm-up activities?

In general, participation in warm-up activities increases circulation throughout the body and causes an increased respiratory rate. In such activities the joints must be moved easily at first and then gradually into a full range of movement. The possibilities of injury to muscles are reduced as the muscles are required gradually to act with increased effort. Relaxation – both physiological and psychological – makes coordinated muscle action possible in the performance of a specific skill or test event. For a period of several weeks prior to testing, pupils should have participated in warm-up and conditioning activities, which cause each pupil to feel comfortable and ready to perform to his optimum capacity.

How should the physical performance testing be organized to make the best use of available time?

There is no definite order in which test events should be given. However, test events involving the same parts of the body or the same sets of muscles should be given on different days. For example, the pull-up and the chair push-up should not be given on the same day.

In a minimum 20-minute physical education period in an elementary school, it is recommended that only one test event a day be given. In such instances one group should be tested while other groups under pupil leadership participate in activities that have been taught previously. Rotation of groups from testing areas to activity areas is continued until all pupils have been tested. Plans for the day's testing should be developed to avoid time being lost by pupils waiting their turn to be tested.

In a 35 or 40-minute period, two test events may be given in one day. In such instances qualified persons (see page 8) should be available to supervise the administration of each test event. With suitable organization and facilities, two groups can be formed with members of the class. A sample schedule for such an arrangement follows.

Sample Schedule for Administering Test Events to Class Divided into Two Groups

Day of testing		Group	Test event
First day	First half of period	I	Knee bent sit-up for time
		II	Standing long jump
	Second half of period	I	Standing long jump
		II	Knee bent sit-up for time
Second day	First half of period	I	Chair push-up
		II	Side step
	Second half of period	I	Side step
		II	Chair push-up
Third day	First half of period	I	Pull-up
		II	Jog-walk
	Second half of period	I	Jog-walk
		II	Pull-up

Descriptions and Instructions for Conducting Each Test Event

The recommended procedure for giving each test event is included in the pages that follow. The format used includes: (1) name of test event; (2) age and sex of pupils; (3) primary elements of physical performance; (4) conditioning activities; (5) warm-up activities; (6) facilities and equipment; (7) description of test event; (8) rules; (9) scoring; (10) suggestions for teachers; and (11) common faults.

STANDING LONG JUMP

Boys and girls *Ages ten through eighteen*

Primary element of physical performance – Leg strength and power

Conditioning Activities

Conditioning activities consist of running in place with knees high; jogging, alternating with running at full speed for 10 to 20 yards; jumping rope for three or four minutes; rebounding on trampoline; performing squat thrusts; performing vertical jump, coordinating arm and leg movement by saying in unison, "down, down, down, up" (arms move down and back on "down" and are thrust forward and upward on "up"); and performing several standing long jumps prior to the day of testing.

Warm-up Activities for Day of Test

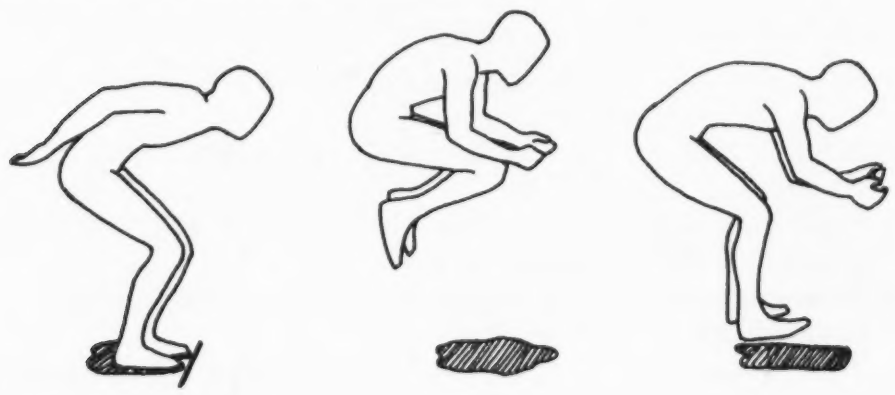
Warm-up activities for the day of testing consist of stretching exercises, such as shoulder stretching by reaching high overhead with both arms from a standing position, stretching backs of legs by grasping soles of feet while sitting with legs straight, and concluding by running in place for short periods of time with exaggerated hip and knee action.

Facilities and Equipment

The landing surface consists of mats, turf, or outdoor rubber matting; the takeoff line is marked on floor or on firm surface adjacent to turf, or a takeoff board may be used A 10-foot metal tape measure and a marker to designate distance jumped are needed. Takeoff board must be level with landing surface.

Standing Long Jump Test Event

The pupil stands with feet several inches apart and with toes just back of the takeoff line or mark or front edge of the takeoff board. The takeoff is made from both feet, and the pupil jumps forward as far as possible, landing on both feet. Free swinging of the arms and bending of the knees is permissable; but during this action of arms and legs, the feet must not leave the takeoff surface or board until the jump is made.



Rules for Standing Long Jump

1. Three successive fair trials (not including fouls) shall be allowed within one testing period, and the best of the three scores is recorded.
2. The pupil's performance is recorded in inches to the nearest inch.
3. The measurement is made from the takeoff line to the heel or any part of the body that touches the surface nearest the takeoff line.
4. Violation of any points under "Standing Long Jump Test Event" constitutes a foul.
5. Shoes with soles that provide firm traction (nonslippery surface) shall be worn.

Scoring the Standing Long Jump

The distance of the best jump shall be recorded in inches to the nearest inch.

Suggestions for Teachers

To ensure reliability of test results, the pupils in the class shall jump on the same type of surface at each testing period. Each pupil shall take his three jumps in succession before another pupil begins the test event. In this method the distance of each jump which is longer than the previous jump can be marked on the surface; and at the completion of the three jumps, only the greatest distance needs to be measured. In the diagram which follows, a procedure is shown in which eight pupils may be tested at one time. The scorers may be a group of pupils who cannot participate or another group of pupils prepared to score for each jumping event.

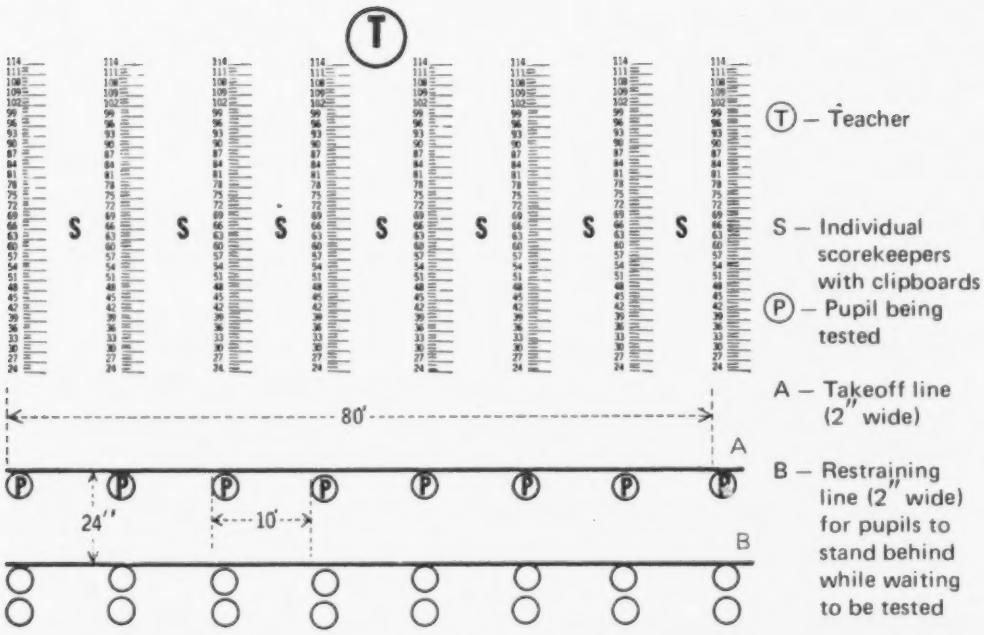
Another procedure is to use the "buddy" system in which one pupil jumps and the buddy measures. After the pupil performing has taken three consecutive jumps, his buddy measures the longest jump. Then the pupil who jumped first exchanges roles – his buddy jumps, and the pupil who jumped first measures.

Common Faults in the Standing Long Jump

1. Both feet are not on the takeoff board when beginning the jump. This is a hop, not a jump.
2. Measurement is not taken from the nearest point of body contact to the takeoff line.
3. Pupil does not keep feet behind the front edge of the takeoff line or board when beginning the jump.
4. Pupil jumps in stocking feet or barefooted on hard surface.
5. Pupil makes a bouncing takeoff.
6. Pupil jumps with heavy boots, coat, or other clothing that is restricting.

Description of Diagram

1. Mark two parallel white lines, each 2 inches wide, on rubber matting, floor, or if nothing else is available, on smooth blacktop 24 inches apart and 80 feet long.
2. Designate eight individual jumping stations 10 feet apart.
3. Mark each individual station with half-inch white lines spaced 1 inch apart, with numbers on every third line beginning at 24 inches. Extend the numbers and lines to the maximum jumping distance for the ages being tested. (See percentile tables for the standing long jump.) The lines and numbers may be painted on strips of wood or measuring stick held securely to the turf with long nails.



Utilization of the Testing Station

Eight pupils may be tested simultaneously, with eight pupils respectively marking each jump the instant it is made. Each jump is marked at the painted inch nearest to the takeoff line or board. Each jumper takes three turns, one after the other, and the best jump is recorded as the score. The teacher is in position to supervise the entire activity, and if he desires, act as scorer.

KNEE BENT SIT-UP FOR TIME

Boys and girls *Ages ten through eighteen*

Primary elements of physical performance –
Abdominal strength and endurance

Conditioning Activities

Conditioning activities for the knee bent sit-up consist of running with knees raised high followed by easy jogging for 300 yards or more; performing curl-ups or sit-ups in own rhythm and gradually increasing number performed; performing stunts on horizontal bar; and performing the exercises which follow:

First exercise. Starting position: lie on back with knees bent and feet parallel and flat on the floor. Contract (tighten) the abdominal muscles and press the back against the floor, but continue to breathe normally; then relax. Repeat several times.

Second exercise. Starting position: lie on back with legs together and straight out and arms extended over head and resting on the

floor. Raise trunk by swinging both arms up and forward so that the hands slap the floor on the outside of the legs somewhere between the knees and ankles. Return slowly to original lying position by tightening the abdominal muscles. Repeat several times.

Third exercise. Starting position: sit with knees bent. Perform a V-sit by straightening legs, raising arms shoulder high, and balancing body on buttocks. Repeat several times.

Fourth exercise. Starting position: lie on the floor with knees bent and drawn up to chest. Extend the legs by straightening them. Slowly lower legs and hold them off the floor for two seconds, and return to the starting position. Repeat several times.

Several sit-ups should be performed before the day on which the pupil is timed.

Warm-up Activities for Day of Test

Warm-up activities for the day of the test event consist of stretching the abdominal muscles from a prone position by raising arms and upper body simultaneously as legs and hips are raised; stretching back from a kneeling position with arms reaching ahead and on the floor; raising alternate knees high while running for one to two minutes; bending body from a standing position; and performing a sit-up two or three times. The pupils should rest but keep warm before the test event is administered.

Facilities and Equipment

A clean floor, a mat, or dry turf and a stopwatch are needed.

Knee Bent Sit-up for Time Test Event

The pupil lies on his back on a clean floor, mat, or turf with his knees bent and feet on the floor. The heels should be not more than 12 inches from the buttocks. The angle at the knees should be less than 90 degrees. The pupil puts his hands on the back of his neck with fingers clasped and places his elbows squarely on the mat, floor, or turf. His feet are held by his partner in order to keep them in touch with the surface at all times. To perform the sit-up, the pupil tightens his abdominal muscles and brings his head and elbows forward as he curls up, finally touching elbows to knees. This action constitutes one sit-up. The pupil returns to the starting position, with his elbows on the surface before he sits up again. The timer gives the signal "ready-go," and the sit-up performance is started on the word "go." Performance is stopped on the word "stop." For all pupils the number of correctly executed sit-ups performed in 60 seconds shall be the score.

Rules for Knee Bent Sit-up for Time

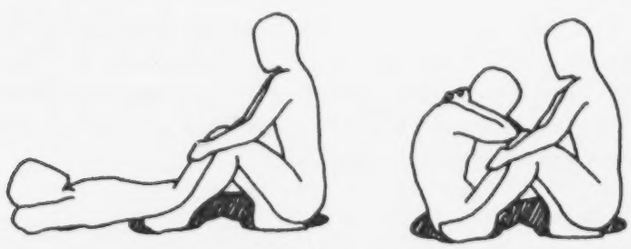
1. Only one trial shall be allowed unless the teacher believes the pupil has not had a fair opportunity to perform.
2. No resting between sit-ups is permitted.
3. No sit-ups shall be counted in which the pupil *does not* (a) keep the fingers clasped behind the neck; (b) bring both elbows forward in starting to sit up without pushing off the floor with an elbow; or (c) return to starting position, *with elbows flat on the surface,* before sitting up again.

Scoring the Knee Bent Sit-up for Time

The pupil's performance shall be recorded as the number of correctly executed sit-ups he is able to do in 60 seconds. A foul nullifies the count for that sit-up. The watch is started on the word "go" and stopped on the word "stop."

Suggestions for Teachers

The person holding the feet should be sure to hold them securely. Pupils should not be permitted to "bounce" off the floor but should be taught to uncurl when returning to the starting position. A heavy, strong pupil may be held securely with a partner sitting on his feet and holding his thighs.



When pupils are performing the sit-up, very careful instructions should be given concerning the position and action of the elbows, both in touching the knees at the height of the sit-up and returning flat to the floor, mat, or turf. Instructions should be given on curling and uncurling so that the hips are not lifted or so that the body does not bounce off the floor. The timer should be given instructions and practice in correctly starting and stopping the watch. Errors in timing result in inaccurate scores.

A group of six or eight pupils may be given instructions to hold the feet of the participants and count the correctly executed sit-ups.

Common Faults in the Knee Bent Sit-up for Time

1. Fingers are not laced and kept behind the neck.
2. Elbows are not brought forward at the start of the sit-ups, nor do they touch the knees at the height of the sit-ups.
3. Elbows are not flattened against the floor, mat, or turf before sitting up.
4. Hips are lifted at the start of the sit-up.
5. Pupils bounce off the floor when executing the sit-up.
6. Pupils are requested to perform on an unclean surface.

SIDE STEP

Boys and girls *Ages ten through eighteen*

Primary elements of physical performance — Agility, balance, and coordination

Conditioning Activities

Conditioning activities for the side step consist of running in place; responding to signals to change directions to the right and to the left, using a slide or a sliding step; increasing speed in changing of directions; performing side straddle hop by jumping to a straddle position while swinging arms overhead vigorously; changing directions while jumping rope; and performing the side step test event without timing.

Warm-up Activities for Day of Test

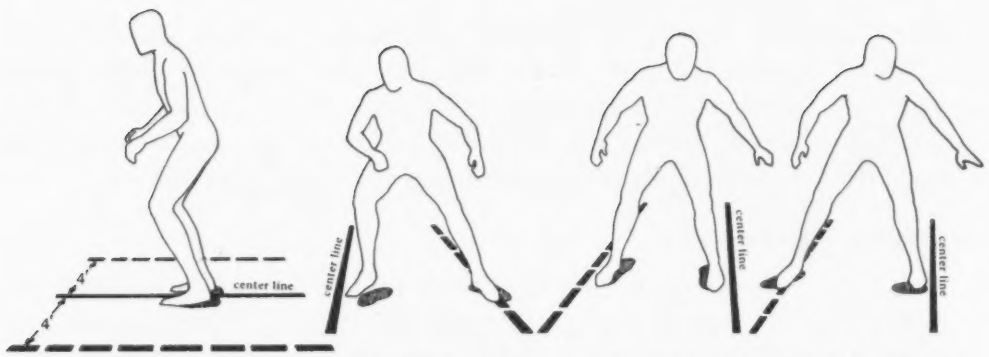
Warm-up activities for the day of the test consist of running in place; jogging; sliding for three steps to the left and then to the right, first in slow motion and then as rapidly as possible; and swinging left leg in front of body from the side for five counts and then repeating with the right leg.

Facilities and Equipment

A clean floor or asphalt and a stopwatch are needed. Three lines, each 1 inch wide, are painted or marked with tape to make a set of three lines 5 feet long with 4 feet between each line. The two outside lines are then 8 feet apart. A 16 foot x 16 foot 4-square court may be used to advantage.

Side Step Test Event

After a warm-up the pupil takes a standing position astride the center line, with feet parallel to the center line. At the signal



Starting position

Starting back to the right after first touching far left line – one point

Continuing to the right, both feet to right of center line – two points

Starting back to left after touching far right line – three points

"ready-go," the pupil, by moving both feet, sidesteps or slides to the left of the center line until the *left foot* touches or crosses the line on the left. This action scores one point. The pupil then sidesteps or slides to the right across the center line by moving both feet, and when the *left foot* touches in the area to the right of the center line, the pupil has two points. He continues side steps to the right until his right foot touches or crosses the line on his right. This action to the right scores one point for the total of three points. He next sidesteps back to his left across the center line, leading with his left foot, and continues to the left until the right foot touches in the area to the left of the center line, which scores the fourth point. The pupil repeats, as rapidly as possible, the side steps to the left, back to the right past the center line to the far right, and back left past the center line to the far left as many times as he can in ten seconds. The signal "stop" is given at the end of ten seconds.

Rules for Side Step

1. Only one complete trial shall be given. If a pupil executes the steps incorrectly within the first few seconds, he may be allowed to start again.
2. A reasonable warm-up should precede the test.
3. The score is the total number of times the pupil crosses the center line with both feet and touches or crosses the left and right lines, as described, during ten seconds.
4. The sidestepping or slide may be done in any manner as long as the feet do not cross one over another and as long as the front of the body (chest and abdomen) faces forward. The pupil should turn head to look toward left line or right line when moving in either of those directions, but he should keep his body facing forward.
5. When touching an outside line, both feet must be on that side of the center line.

Scoring the Side Step

The score is the total number of designated lines crossed or touched in ten seconds. If a pupil does not touch or cross a side line, the action does not count. If he does not cross the center line with both feet, the action does not count. If he crosses one foot over the other, one point is subtracted for each such action.

Suggestions for Teachers

The timer should have practice prior to the administration of the test event to become familiar with the correct operation of the stopwatch so that accurate timekeeping results. Ten seconds is so short a time that great inaccuracy results in the score if any error is made in keeping time. The starting and stopping of the watch can best be performed with the index finger. The watch is started at the word "go" and stopped at the word "stop." One timer can be used for several pupils performing the test event if several sets of lines are marked and each performer has one person counting his score. The person who is timing should stand in front of the pupil performing, and the one who is counting should stand in back of the pupil performing. The surface should be kept clean to prevent slipping. The pupils should be encouraged to move in a balanced, semicrouched position while sliding, with eyes looking ahead and not down.

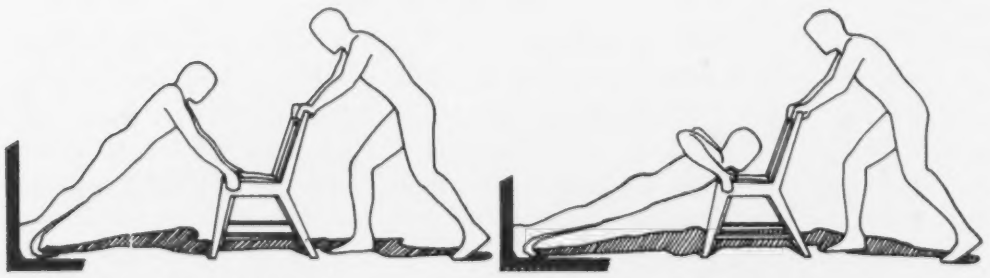
Common Faults in the Side Step

1 Pupil crosses feet as side step is taken.
2. Pupil twists body to face in the direction of sidestepping instead of keeping chest and abdomen facing forward.
3. Pupil tries to increase score by taking a wide stride position.

CHAIR PUSH-UP

Boys and girls *Ages ten through eighteen*

Primary elements of physical performance – Upper body and arm strength and endurance



Ready position Starting position

Conditioning Activities

The conditioning activities for the chair push-up consist of jogging and running for three to four minutes followed by performing such exercises as jumping jack, arm circling, measuring worm, and crab walk; climbing a vertical pole or rope; walking on all fours; performing the horizontal bar swing and other gymnastic activities; doing the knee push-up; and performing a chair push-up several times prior to the day of being tested.

Warm-up Activities for Day of Test

Warm-up activities for the day of the test event consist of running and jogging or performing the side straddle hop for three or four minutes followed by shoulder stretching from a standing position and anterior arm stretching by pulling arms, kept at shoulder height, toward each other in the back.

Facilities and Equipment

A sturdy, nonfolding chair, the seat of which measures 14 to 18 inches above the floor, and a wall against which the feet may be braced are required. A sturdy bench, which can be securely held, may be used. Attention should be called to the fact that the hand grip on a bench is different from that used on the chair. A towel to keep the gripping places on chair or bench dry and clean, as well as chalk for the hands, should be available.

Chair Push-up Test Event

The pupil grips the front of the seat at the corners of the chair and assumes a front leaning rest position, with legs together, both feet against a wall, and the toes supporting his legs. The chair is held securely by a partner.[2] The performer's body should form a straight line and be at right angles with his arms. The pupil lowers his body by bending (flexing) his elbows until his chest touches the nearest edge of the chair seat, which is the starting position for the chair push-up. The chest touches the edge of the chair at a point even with the armpits or above the nipple line so that the body is lowered at the point at which the arms made a right angle to the body. The arms are then straightened (extended) to return the body to a position to form a straight line and be at right angles with the arms. This movement completes one push up.

A pupil may assume the starting position as illustrated by placing the hands properly at the corners of the chair and placing one foot

[2]In the film, "Physical Performance Test for California, 1971," the pupil assistant is holding the chair with both hands and bracing it with one foot. The junior high school teachers and pupils involved in the film found that such a position kept the chair held securely. This position was selected in contrast to the position used in the sampling and illustrated in this publication.

against the wall and the other foot against the floor with the knee bent. When the grip is comfortable and the chest is against the edge of the chair, the bent leg is straightened, and the foot is placed against the wall in the starting position. Such action may be easier for those with less than average strength.

If a bench is to be used, the edge is grasped by the four fingers on top and the thumb underneath the bench.

Rules for Chair Push-up

1. No resting is permitted between push-ups.
2. No push-up shall be counted in which the pupil fails (a) to keep the body straight from head to heels; (b) to touch the chest to the edge of the chair; or (c) to push up to a full extension of the arms.

Scoring the Chair Push-up

The score is the number of push-ups performed during which no foul has been committed. The pupil is stopped at the end of the fiftieth push-up.

Suggestions for Teachers

In order for the pupil to be in the best position to perform the chair push-up, he should stand with his back against the wall and then lie face down (prone) on the floor, keeping his toes against the wall. The teacher or an assistant marks the spot on the floor directly under each armpit and directs the pupil who is responsible for holding the chair to put each of the two front legs of the chair, respectively, on the marked spots on the floor which indicated each armpit. The chair then is at the distance from the wall which allows the pupil to be in a perfect position to perform the test event.

The teacher instructs the partner of the pupil performing the push-up to hold the chair securely as he stands behind the chair. A third pupil places his hand on the edge of the chair to make certain the chest touches on the downward movement. The third pupil calls "foul" if the chest does not touch the hand on the edge of the chair. A fourth pupil should see that the body is maintained in a straight line and count the number of correct push-ups made in accordance with the number of fouls called out by pupil number three.

In another procedure the third pupil may be the scorer. He places his hand on the edge of the chair to make certain the chest touches on the downward movement. The count is called out loud each time the performer touches the hand of the scorer. A fourth pupil should see that the body is maintained in a straight line and calls out "foul" if the body arches or sags.

Common Faults in the Chair Push-up

1. Body is not kept in a straight line from heels to head.
2. Arms are not fully extended.
3. Chest does not touch at the edge of the chair on each downward movement.
4. Arms are not kept at right angles to the body.

PULL-UP

Boys and girls *Ages ten through eighteen*

Primary elements of physical performance – Upper body and arm strength and endurance

Conditioning Activities

Conditioning activities consist of doing a fast walk, which increases to a run for 300 yards, followed by performing exercises for five minutes, such as jumping jack, side straddle hop, and arm fling; climbing ropes or poles; performing gymnastic and tumbling stunts, using arms to hold and move the body; doing chair push-ups; doing chin-ups, with palms of hand toward face; and performing a pull-up with back of hands toward the face.

Warm-up Activities for Day of Test

Warm-up activities for the day of testing consist of running and jogging for three or four minutes; doing stunts on a horizontal bar, such as front lean and skin-the-cat; and then performing side straddle hops and side arm flings for one or two minutes. This test event should be administered after two or three minutes of rest.

Facilities and Equipment

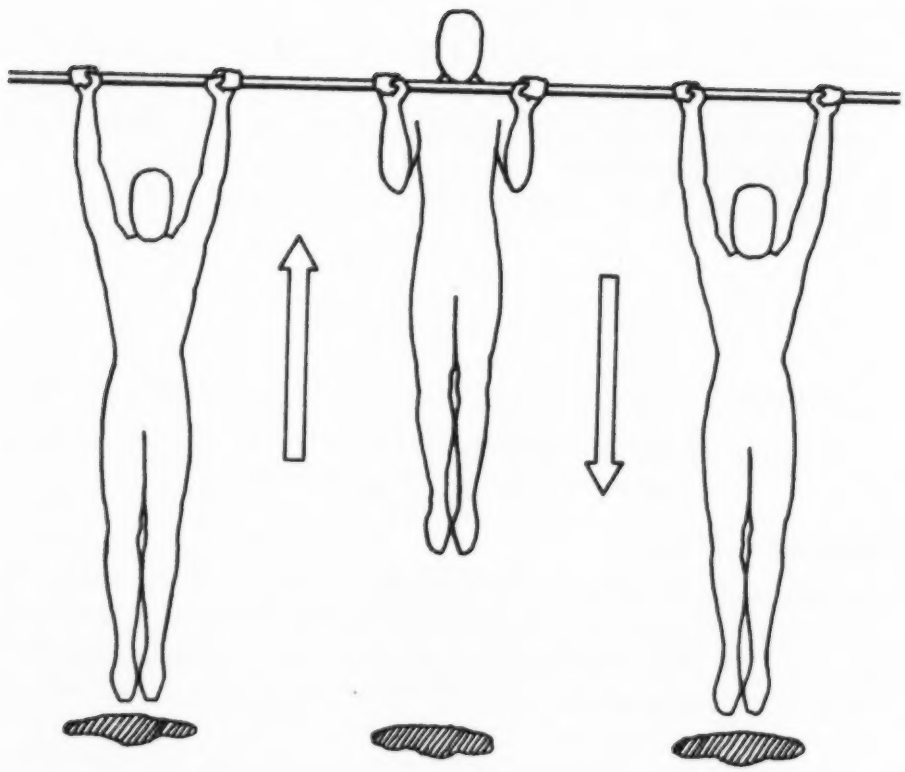
A metal chinning bar that is 1¼ inches in diameter and is clean and stationary is needed.

Pull-up Test Event

Bar should be at a height that will permit the pupil to hang so that the arms and legs are fully extended and the feet are a few inches above the ground. The pupil should grasp the bar with a forward grip (back of hands toward face and thumb under and around bar). The pupil then raises the body by the arms until the chin is above and not over the bar, and, without stopping, he then lowers the body to a full hang as in the starting position.

Rules for the Pull-up

1. Only one trial shall be allowed, unless for some reason the teacher believes that the pupil has not had a fair opportunity to perform.



2. The body must not swing during the execution of the movement (a partner may assist in preventing swinging).
3. The knees must not be raised, and kicking of the legs is not permitted.

Scoring the Pull-up

The pupil's performance shall be recorded as the number of correctly executed pull-ups. One complete pull-up is counted each time the pupil places his chin above the bar.

Suggestions for Teachers

The bar used for this test should not be dirty, sweaty, or rusty, as such conditions often injure the pupil's hands. Pupils should be given assistance in reaching the bar for this test event if the bar is out of easy reach by jumping.

Common Faults in the Pull-up

1. Body swings during pull-up.
2. Knees are raised.
3. Legs are kicked.
4. Resting takes place between pull-ups.
5. Arms are not fully extended between pull-ups.
6. Pupil places chin over bar at top of pull-up by stretching his neck instead of pulling his body to a sufficient height.
7. Pupil uses reverse hand grip instead of front hand grip.

JOG-WALK

Boys and girls *Ages ten through eighteen*

Primary element of physical performance –
Cardiorespiratory endurance

Conditioning Activities

The conditioning activities for the jog-walk follow: for a minimum period of four weeks prior to administering the jog-walk test event, much of the physical education period should be spent in walking, jogging, running, and performing other endurance-type activities. During the preparation period, the amount of time spent in jogging and running should increase, and the amount of time spent in walking should decrease. The speed at which pupils jog should gradually increase.

A pupil who has not become accustomed to jogging long distances may experience discomfort even to the extent of an upset stomach on occasion. Therefore, when this occurs, it is an indication that more cardiorespiratory endurance activities, such as jogging and running for extended periods, should be included in the program before the test event is administered. Pupils should be aware that this is a jog-walk event and that they may walk to recover prior to jogging or running again. Each pupil should jog and walk for six minutes or more prior to the time of being tested.

Warm-up Activities for Day of Test

Warm-up activities for the day of testing consist of stretching calf muscles (gastrocnemius) by leaning against a wall and keeping knees straight; and jogging and walking for a minute or so.

Facilities and Equipment

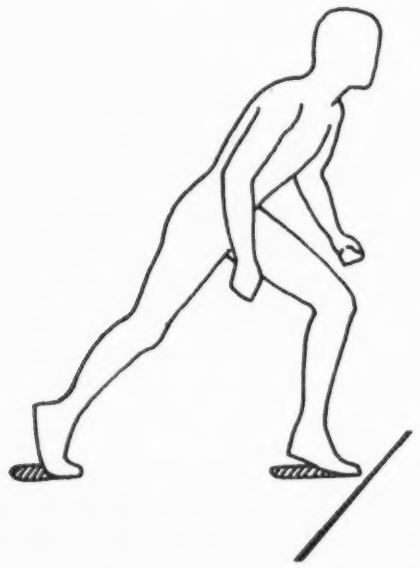
An accurately measured running area (see diagrams on page 26) and a stopwatch are needed.

Jog-walk Test Event

The pupil takes his position for a standing start behind the starting line. (See illustration.) The starter takes a position at the starting line and uses the command, "Get on your marks," as a preparatory signal to alert all runners. "Set" is given when all runners indicate they are ready by being motionless and looking directly down the track. "Go" is spoken by the starter approximately two seconds after the "set" command.

Ten pupils, five at the starting line and five directly behind, may jog-walk at one time if the track is sufficiently wide and enough recorders are available. A recorder is assigned to each runner to count the number of 110-yard segments he covers. The timer

signals the completion of six minutes by a whistle blast or other suitable means. The recorder announces the total number of 110-yard segments the pupil for whom he is responsible has completed, plus the one the pupil is in at the time the signal to stop is given. A 440-yard track or course is marked in fourths, each of which is 110 yards, or a course may be laid out with a radius of 70 yards around the periphery of the playground, which gives a 440-yard circle. Each quarter of the circle is 110 yards, and the distance is recorded in quarters or fractions thereof. Note: If the playground is limited in size, a 35-yard radius will produce a 220-yard course, and the jogger will be required to run half a circle for each 110 yards. (See diagram for possible courses.) In some extremely small schools, pupils may have to run around the school site.



Rules for Jog-walk

1. Only one trial is given.
2. Walking is permitted, but the object is to cover the greatest distance in the designated time.

Scoring the Jog-walk

The score is the number of 110-yard segments completed, plus the one the pupil is in at the time the signal to stop is given.

Suggestions for Teachers

The teachers should consult with the school nurse and study each pupil's health record to determine the physical limitations of any pupil before the pupil jogs or runs for distance. Teachers should watch for symptoms of poor reaction to vigorous exercise as pupils participate in any running activities, especially as the distance and duration are increased. The teachers should be alert

to the following conditions,[3] which may or may not indicate a health problem for a pupil:

Excessive breathlessness. Some breathlessness is normal with exercise, but breathlessness that persists long after exercise is cause for medical referral

Bluing of the lips. Except in a cold wet environment, bluing of the lips or nailbeds is an unnatural reaction to exercise. Its occurrence in the ordinary exercise setting is cause for medical referral.

Pale or clammy skin. Pale or clammy skin or cold sweating following or during exercise is not a normal reaction to physical activity within the usual temperature ranges of the gymnasium or playing field. Again, medical referral is recommended.

Unusual fatigue. Excessive fatigue, as evidenced by unusual lack of endurance or early failure to maintain moderate activity, also suggests the need for medical referral. It is dangerous to attribute such reactions to the pupil's attitude until possible organic causes have been ruled out.

Persistent shakiness. Unusual weakness or shakiness that continues for more than ten minutes following vigorous exercise is cause for medical referral. Normally recovery will be reasonably prompt.

Muscle twitching or tetany. Muscular contractions, such as twitching or tetany, whether localized or generalized, sometimes occur as an unusual reaction to exercise. They may be abnormal and warrant medical investigation.

An occasional reaction to exercise may not be cause necessarily for medical referral, but recurring or persisting of any of the following conditions in conjunction with physical performance indicates the need for medical referral and avoidance of exercise until the pupil has been approved medically for vigorous activity: (1) headache; (2) dizziness; (3) fainting; (4) broken night's sleep; (5) digestive upset; (6) pain not associated with injury; (7) undue pounding or uneven heartbeat; and (8) disorientation or personality changes.

Teachers should consider the condition of the pupil, such as obesity and convalescence, and the weather, such as high temperature and high humidity, before the decision to administer the jog-walk is made for a particular pupil and on a particular day. Some pupils will not be in condition to take this test in any one year and should be given special help.

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[3] "Health Problems Revealed During Physical Activity," *Journal of Health-Physical Education-Recreation*, XXXVI (September, 1965), 6.

The jog-walk should never be run in a shuttle formation, because time is lost in changing directions.

Common Faults in the Jog-walk

1. The jogger cuts in front of another jogger and forces him to lose stride.
2. The jogger may begin too fast instead of pacing himself properly to cover the farthest distance possible.
3. The jogger is not in condition to take the jog-walk test event, and undue physical-emotional distress results.

The testing stations designated by the school or school district should remain the same each time the test is administered, thus keeping the results of the pupils' performances consistent for each school.

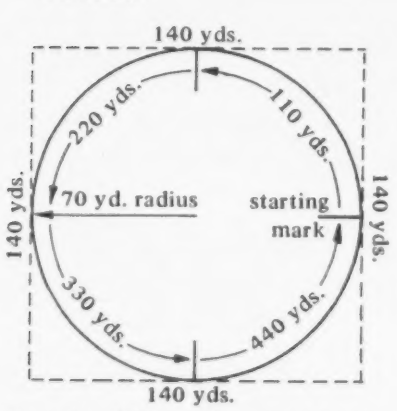


Fig. II-1. 440-yard round track.

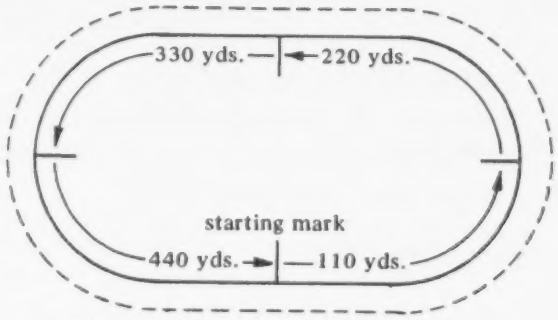


Fig. II-2. 440-yard oval track.

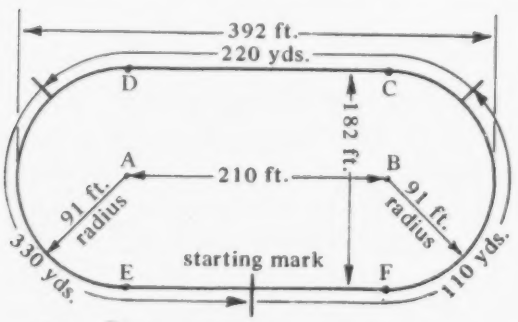


Fig. II-3. 330-yard oval track. Determine points A and B, which are 210 feet apart. Mark two arcs each 91 feet long with a rope or string which is 91 feet long from point A and from point B to establish the curves of the oval. Connect C and D and E and F to complete the oval.

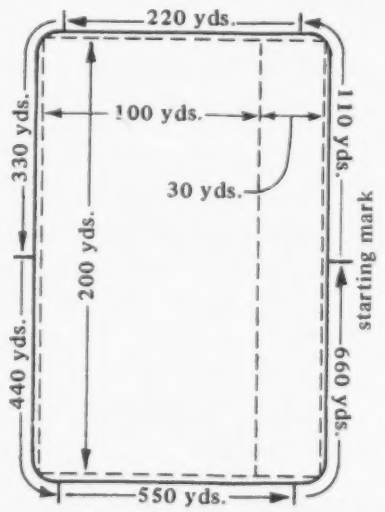


Fig. II-4. 660-yard track. Adapt the 660-yard track from a 600-yard track. Extend the 600 yards for 30 yards, and draw an oval touching each corner, thus making 660 yards.

To score the jog-walk test event on any of the above tracks, count the number of 110-yard segments the pupil jog-walks from the starting mark, plus the segment he is in when he stops.

CHAPTER III

Recording and Reporting Test Results

Questions most frequently asked about what to do with the test results and the answers to those questions follow. The questions are grouped under three headings according to recording, reporting, and processing the test results.

Recording Test Scores

What recording of test results is necessary?

The raw score made by each pupil on each test event shall be recorded in the pupil's cumulative record. These scores also may be recorded on a class record form and individual pupil reports.

How should raw scores be made meaningful?

Raw scores are made meaningful when compared with scores made within a year, and the amount of improvement, lack of improvement, or loss of performance is noted. The cause of such scores should be investigated with the pupil in terms of health, growth, emotional upset, and performance expectancy by both pupil and teacher.

Raw scores interpreted as percentiles or stanines can be used to compare performances with other pupils of the same age and sex.

What are percentiles?

The percentiles indicate the proportion of subjects in a comparable age-sex category that the pupil has equalled or exceeded in that test event. Percentiles often are more informative than raw scores. For instance, if a ten-year-old boy jog-walks nine 110-yard segments in six minutes, he is at the 20th percentile and as high as 20 percent of the California sample; if he can jog-walk 15 segments, he is as good or better than 90 percent of the ten-year-old boys in the sampling for California.

What are stanines?

Stanines are artificially scaled scores which are derived from a normal distribution curve. There are nine possible stanines – one through nine – with a mean of five. Each interval represents one-half of a "standard deviation" of the normal distribution. Thus, a stanine of six would be about one-half a standard deviation above the mean. Stanines are cruder indicators than percentiles and may not be

applicable if the raw score distributions are irregular, as they are in the pull-up events.

How are percentiles used?

Use of percentiles makes it possible for a teacher to determine quickly each pupil's position on a scale established by a sampling of scores of boys and girls in California. For example, if a pupil scores at the 70th percentile in the pull-up, it means that his score is exceeded by only 30 percent of all scores of the pupils tested. From this initial test result, the level of the pupil's performance at that date is known. A pupil who scores at the 70th percentile is performing at a better than average level.

Pupil progress may be determined only by comparing the results of a second test with the initial test results. Cumulation of test scores shows the achievement gained or lost by the pupil during his elementary and high school years. This information should be reported to the pupil, his parents, and appropriate school personnel. The test record of an individual pupil, a class, a school, or a district can be compared to the California state norms contained in this publication. (See Chapter V, tables 1 through 12.) In the comparisons it is important to consider such factors as previous practice or exposure to the events, selective procedures in testing, equipment needs, and other local factors.

The number or percent of the pupils who score at or below the 25th percentile in one or more of the events in the test should be reported, and the pupils should be provided with special help in physical education. The number or percent who score between the 25th and 75th percentiles have scores comparable to those of half of the pupils in the state. Those pupils who score above the 75th percentile have scores comparable to the highest 25 percent of the pupils in the state.

Teachers should be aware that as instruction improves and opportunity for practice increases, the physical performance of boys and girls of each age will improve. Performance in the pull-up will improve especially as instruction and practice increase in activities which strengthen the arms and upper body.

Reporting Test Results

What scores should be reported to the governing board of the school district?

The number or percent of pupils scoring at designated percentiles, by sex and age, for each test event should be reported. The percentiles selected should demonstrate both strengths and weaknesses and present a fair picture of the type of instruction which has been possible with the existing personnel, facilities, and supplies. The relationship of the pupils' health to physical performance should be analyzed and reported. (Refer to Chapter IV, "Using Test Results.")

Who reports test scores to the governing board of the school district?

The superintendent or designated representative submits test scores to the governing board of the school district (California Administrative Code, Title 5, Education). In a large school district, a random sampling of test scores may be reported to the governing board of the school district instead of presenting the board with a compilation of each raw score.

When are test scores reported?

Dates are established by the governing board (California Administrative Code, Title 5, Education), and the reporting is accomplished before the end of the school year.

How are test scores reported?

Forms prescribed or approved by the governing board are used. Forms should make it possible to present information which includes the number and percent of pupils improving in performance and scoring in the low percentiles and in the high percentiles. Suggestions for improving the test results, such as acquiring necessary equipment, should accompany the report to the board.

What scores are recorded in the pupil's cumulative record?

The pupil's raw score for each test event should be recorded on an appropriate form. It is recommended that percentiles and stanines also be included. Progress or lack of achievement can be best shown by reporting the scores on a cumulative form on which is provided *raw scores from two testing periods annually for ages ten through eighteen.* Districts may decide to include additional information in the pupil's cumulative record, such as a program developed for the pupil or circumstances which assist in clarifying the scores recorded.

Processing Test Scores

What methods of processing scores may be utilized?

Machine processing, hand processing, or a combination of machine and hand processing may be utilized. Machine processing is easier than ever before and should be considered for large schools.

What method of data processing should be selected?

Each school district or county superintendent of schools office should consider cost and teacher time in processing test results.

Some machines are not designed to produce output forms with the necessary analysis of Physical Performance Test results. Regional educational data processing centers are available throughout the state and have the necessary computers for scoring and reporting the results of the Physical Performance Test at a nominal cost. (A list

giving the names and addresses of the nine centers appears at the end of the chapter.)

When funds are not available for machine processing, teacher and clerical time may be utilized for hand processing the test items. The cost of machine processing varies from 15 cents to 20 cents per pupil for the six-item test. Cost figures for hand processing are highly variable.

What are machine processed reports?

Machine processed reports are reports in which data are automatically processed by electronic machines.

What forms of reports are necessary for recording and reporting through machine processing?

Various forms have been developed for use in recording and reporting test results that are processed by machine.

- Individual mark sense cards or scoring forms are used for recording pupils' raw scores.
- Class record sheets are used by the teacher to assist in identifying weaknesses in individual pupils or in the physical education program.
- District summary sheets are used for reporting scores to the governing board of the school district.
- Gummed labels are applied in pupils' cumulative records for the appropriate year.
- Individual report forms are used by the teacher, counselor, or administrator for individual consultation and reporting to parents. A carbon of the individual report form may be placed in the cumulative record in lieu of a gummed label.

The figures presented in this chapter are samples of recording and reporting forms. Some are involved in machine processing, others simplify the recording by hand, and one can be completed by hand or the information may be supplied on a gummed label processed by a machine.

Figure 1 is a sample of a mark sense card which may be used to record the raw scores of each test event in the Physical Performance Test. The area on the left of the card is supplied as a help to the scorer to record scores in pencil. The final scores must be recorded by filling in the bubbles with an electrographic pencil (mark sense). One bubble only in each column must be filled in to record a proper score. For example, a score of ten pull-ups would be marked in the columns headed "Pull-up" by filling in bubble one in the left column and bubble zero in the right column. If the score were eight pull-ups, bubble zero in the left column and bubble eight in the right column should be marked. A score of 103 inches in the standing long jump should be marked under that heading as follows: bubble one in the

PHYSICAL PERFORMANCE TEST

STUDENT'S AGE IN YEARS MUST BE FILLED IN→

FINAL SCORES MUST BE MARKED IN THE BUBBLES TO THE RIGHT.

USE THIS AREA FOR PRELIMINARY RECORDING

STANDING LONG JUMP ____ ____ ____

KNEE BENT SIT-UP ____

CHAIR PUSH-UP ____

SIDESTEP ____

PULL-UP ____

JOG-WALK ____

FILL BUBBLES WITH HEAVY BLACK MARKS USE ONLY AN ELECTROGRAPHIC (MARK SENSE) PENCIL

YEARS OLD	STANDING LONG JUMP			KNEE BENT SIT UP		CHAIR PUSH UP		SIDE STEP		PULL UP		JOG WALK	
TENS UNITS	HUNDRED	TENS	UNITS	TENS	UNITS	TENS	UNITS	TENS	UNITS	TENS	UNITS	TENS	UNITS
FILL IN AGE OF STUDENT AT TIME OF COMPLETION OF TEST.													

ONE AND ONLY ONE BUBBLE MUST BE FILLED IN EVERY COLUMN FOR EACH TEST ADMINISTERED.
IF AN UNSUCCESSFUL ATTEMPT IS MADE, FILL IN ALL ZEROS FOR THAT EVENT.

Fig. III-1. Mark sense card. This card was developed for use at the Ventura Regional Educational Data Processing Center, Ventura County Superintendent of Schools Office, Ventura.

first column, bubble zero in the second column, and bubble three in the third column to the right.

Figures 2a and 2b are two sides of a scoring form or answer sheet, which is processed directly by optical scanning in a machine. If the forms are not completed properly, the machines are programmed to

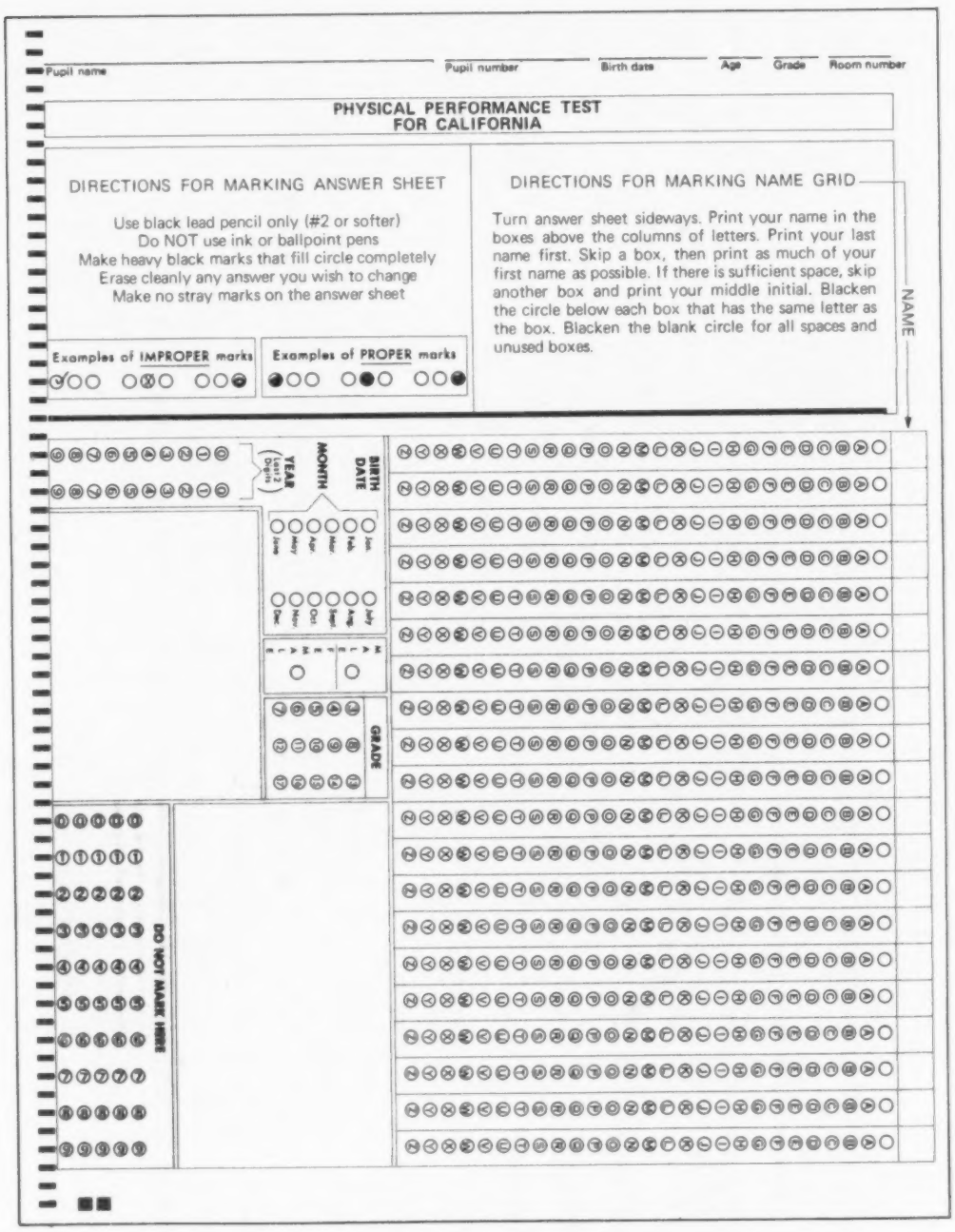

Pupil name
Pupil number
Birth date
Age
Grade
Room number
PHYSICAL PERFORMANCE TEST
FOR CALIFORNIA
DIRECTIONS FOR MARKING ANSWER SHEET
Use black lead pencil only (#2 or softer)
Do NOT use ink or ballpoint pens
Make heavy black marks that fill circle completely
Erase cleanly any answer you wish to change
Make no stray marks on the answer sheet
Examples of IMPROPER marks
Examples of PROPER marks
DIRECTIONS FOR MARKING NAME GRID
Turn answer sheet sideways. Print your name in the boxes above the columns of letters. Print your last name first. Skip a box, then print as much of your first name as possible. If there is sufficient space, skip another box and print your middle initial. Blacken the circle below each box that has the same letter as the box. Blacken the blank circle for all spaces and unused boxes.
NAME
BIRTH DATE
MONTH
YEAR
GRADE
DO NOT MARK HERE

Fig. III-2a. Score form machine processed by optical scanning. This form was developed for use at the Los Angeles Regional Educational Data Processing Center.

reject them. The appropriate circles are filled in with a black lead pencil only (a number 2 or softer). Complete directions are printed directly on the forms. Since the forms are printed on paper and come in packets (usually of 25), great care must be taken by pupils, scorers, and teachers that the forms are kept smooth and unwrinkled.

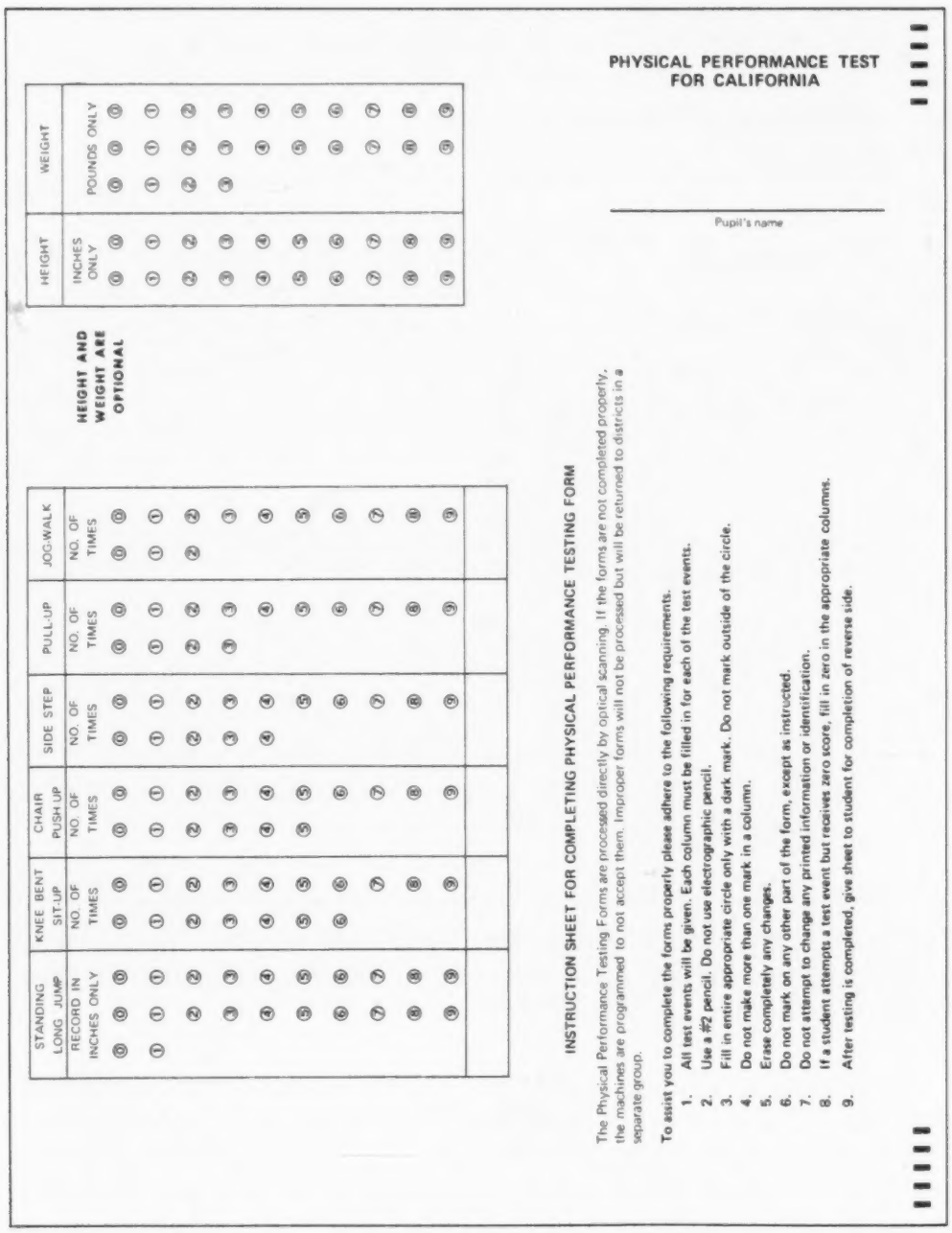

PHYSICAL PERFORMANCE TEST
FOR CALIFORNIA
Pupil's name
WEIGHT
POUNDS ONLY
HEIGHT
INCHES ONLY
HEIGHT AND WEIGHT ARE OPTIONAL
STANDING LONG JUMP
RECORD IN INCHES ONLY
KNEE BENT SIT-UP
NO. OF TIMES
CHAIR PUSH UP
NO. OF TIMES
SIDE STEP
NO. OF TIMES
PULL-UP
NO. OF TIMES
JOG-WALK
NO. OF TIMES
INSTRUCTION SHEET FOR COMPLETING PHYSICAL PERFORMANCE TESTING FORM
The Physical Performance Testing Forms are processed directly by optical scanning. If the forms are not completed properly, the machines are programmed to not accept them. Improper forms will not be processed but will be returned to districts in a separate group.
To assist you to complete the forms properly please adhere to the following requirements.
1. All test events will be given. Each column must be filled in for each of the test events.
2. Use a #2 pencil. Do not use electrographic pencil.
3. Fill in entire appropriate circle only with a dark mark. Do not mark outside of the circle.
4. Do not make more than one mark in a column.
5. Erase completely any changes.
6. Do not mark on any other part of the form, except as instructed.
7. Do not attempt to change any printed information or identification.
8. If a student attempts a test event but receives zero score, fill in zero in the appropriate columns.
9. After testing is completed, give sheet to student for completion of reverse side.

Fig. III-2b. Score form machine processed by optical scanning. This side of the form is used for recording the pupil's scores in the test events.

Figure 3 is a sample of a printout (produced by a machine) that provides information for each pupil in a class of boys in physical education. The age is shown in months for each boy, and his raw score and percentile for each test event are listed. Such information is helpful to teachers in developing physical education programs to meet the needs of those with raw scores in the 25th or lower percentiles. In order to be most helpful for individualizing instruction and counseling each pupil, the raw scores of previous tests for each boy within the year, or at least the last grade or chronological age, should be available for comparison.

Roster of test results		Grade 12	Number of school 34-67314-3432573	School identification Snow High		Date 09/21/70		Page no. 11
Ability scores	Student name	ACHIEVEMENT SUBTEST IDENTITY Physical Education						
		Age		Stg. long jump	Sit-up	Chair push-up	Side step	Pull-up	Jog-walk
	Black, John	215	RS	78	49	57	19	5	12
			PC	20	50	95	45	20	25
	Brown, Bill	219	RS	87	61	49	23	14	14
			PC	50	85	85	80	85	55
	Green, Mark	216	RS	95	61	45	27	7	13
			PC	80	85	75	95	40	35
	Jones, Mike	233	RS	84	57	40	22	1	12
			PC	35	75	65	70	5	25
	Smith, Larry	215	RS	96	55	39	17	11	15
			PC	85	70	60	30	70	75
	White, Jim	222	RS	94	52	34	18	14	15
			PC	75	60	50	35	85	70
Total 158									

Age is in months.
Number for school is the common CDS Code as described in the current *California Public School Directory*, published by the California State Department of Education.
Number under ability scores is total number of students enrolled in grade twelve in Snow High School.
RS is raw score, PC is percentile.

Fig. III-3. Class record sheet. This figure was adapted from a sheet developed for use at the Sacramento Regional Educational Data Processing Center.

The report to parents shown in Figure 4 is machine processed as a printout and can be easily understood by parents and pupils. The raw scores are interpreted as low, average, and high. According to this information, Marie Smith needs an individualized program which will increase the strength in her arms and upper body. She also needs practice in jogging for increasingly longer periods of time if a study of her health records and physical education experience warrants such emphasis. Illness may have prevented her from participating in vigorous physical activity. It should be noted that the average group covers a very wide range of scores and pupils. Because of such a wide

Report to Parents
CALIFORNIA PHYSICAL PERFORMANCE TEST
for School Year 1970–71

Name of student	Grade	District	School
Smith, Marie	07	Colton	Jr. High School

Dear Parent

This is a report of your child's achievement in the Physical Performance Test for California.

The placement of "x" indicates the level of performance achieved by this pupil when compared with the scores of pupils of the same age and sex in the school districts of California.

Sincerely,

Dr. Paul Jones
Superintendent of Schools

Name of test	First semester				Second semester			
	Score	*Low*	*Avg.*	*High*	*Score*	*Low*	*Avg.*	*High*
Jump	068			x	069			x
Sit-up	32		x		34		x	
Push-up	5		x		6		x	
Side step	16		x		16		x	
Pull-up	0	x			0	x		
Jog-walk	9	x			10	x		

Fig. III-4. Individual report form. This form was adapted from a machine processed form developed in the office of the San Bernardino County Superintendent of Schools.

range in the average group, in many schools a printout with four groupings, such as low, fair, good, and high, is requested.

The individual test profile used by the office of the Los Angeles County Superintendent of Schools, as shown in Figure 5, provides a profile of the raw scores interpreted as percentiles and stanines. A letter briefly describing the purpose of the Physical Performance Test should accompany the report to the parents. An explanation of percentiles and stanines should be included in the letter. The profile

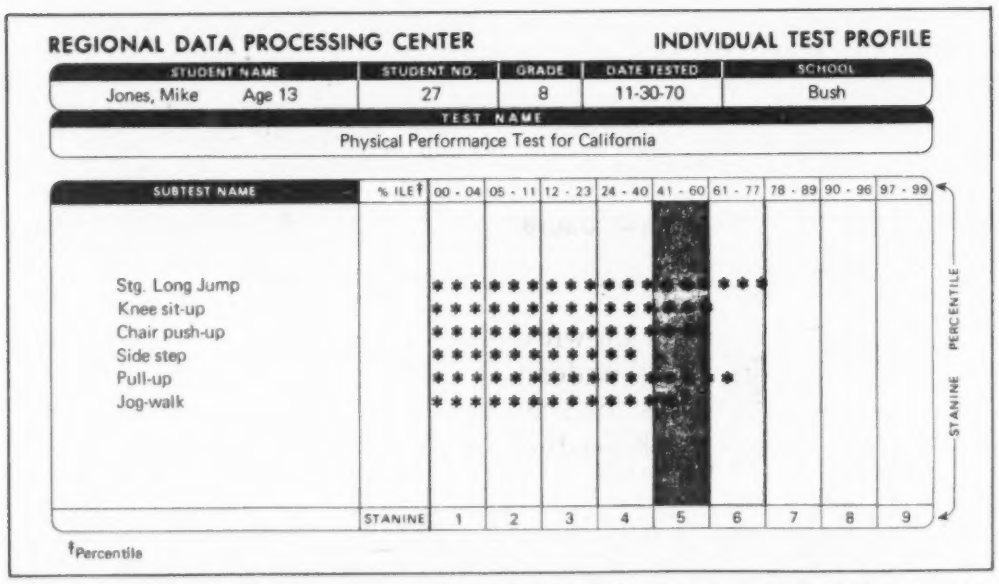


Fig. III-5. Individual test profile. This card was developed for use in the Los Angeles Regional Educational Data Processing Center.

provides a picture of the pupil's performance compared with other pupils of the same age and sex in California.

In Figure 6 the use of individual gummed labels on an individual cumulative record is demonstrated. Two gummed labels, one for fall, 1970, and one for spring, 1971, have been attached to the cumulative record of Mary Jones to show both the raw scores and percentiles for each test event. Test results within one school year

Name of pupil Jones, (Last) Mary (First)

Grade 5 Age 11 Ht. 56" Wt. 80 lbs. Teacher Miss Brown

F/70

	LJ	SU	CPU	SS	PU	JW
RS	64	42	9	14	0	10
PC	75	95	60	60		50

Name of pupil Jones, (Last) Mary (First)

Grade 5 Age 11 Ht 57" Wt. 85 lbs. Teacher Miss Brown

S/71

	LJ	SU	CPU	SS	PU	JW
RS	65	51	12	14	1	11
PC	80	99	75	60	80	65

Name of pupil Jones, (Last) Mary (First)

Grade ____ Age ____ Ht. ____ Wt. ____ Teacher ____

Name of pupil Jones, (Last) Mary (First)

Grade ____ Age ____ Ht. ____ Wt. ____ Teacher ____

Fig. III-6. Test cumulative record. This form was adapted from one developed for use in the office of the Los Angeles County Superintendent of Schools.

provide an excellent assessment of the effect of the physical education program on the performance of Mary Jones. She has improved in the standing long jump, the knee bent sit-up, chair push-up, pull-up, and jog-walk. Her agility as tested in the side step remained the same as in the fall. Such a cumulative record may include records for ages ten through eighteen by utilizing both sides of the card.

The Physical Performance Cumulative Test Record Card in Figure 7 can be tabulated by hand or by attaching a machine processed gummed label. The office of the Sonoma County Superintendent of Schools produced a card with space for results from two testing periods for grades five through eight on one side and nine through twelve on the other. For ease of identification, cards for boys are a different color from those for girls. Spaces are provided for recording by hand the raw scores and percentiles for each test event. In addition space is provided for additional test events district personnel may wish to administer.

What are hand-processed reports?

Hand-processed reports, as the name implies, are reports which are prepared by hand. Raw scores are manually recorded by the recorder, and any additional information is converted by hand to make the scores more meaningful.

What information is necessary for reporting and recording data by hand?

The pupil's name, age, sex, school, and each event in the test should be included on the report form.

What forms are necessary for reporting and recording data by hand?

Hand processing test data requires the use of several forms:

- A class record sheet for recording raw scores.
- An individual pupil record card for interpreting scores to parents, pupils, and other interested personnel, and for use in the cumulative record.
- A composite report to the governing board of the school district, which should illustrate strengths and weaknesses of the physical education program.
- Charts or graphs may make the interpretation of test results more meaningful to pupils, administrators, governing boards, and other interested groups but are not required.

Figure 7 is a sample of one type of hand-processed card. Another sample of a hand-processed card is shown in figures 8a and 8b, which can be used by the teacher at the testing site, used as a basis for counseling with pupils and parents, and stored in the cumulative record if desired. The office of the Siskiyou County Superintendent of Schools adapted the "Quick Scoring Pupil Record Card" from one

that was developed in the Sutter County Superintendent of Schools office. Instructions are shown in Figure 8a, which is one side of the card, and the scores and percentiles on the other side of the card are shown in Figure 8b. Cards for boys may be in a color that is different from the cards for girls for quick identification.

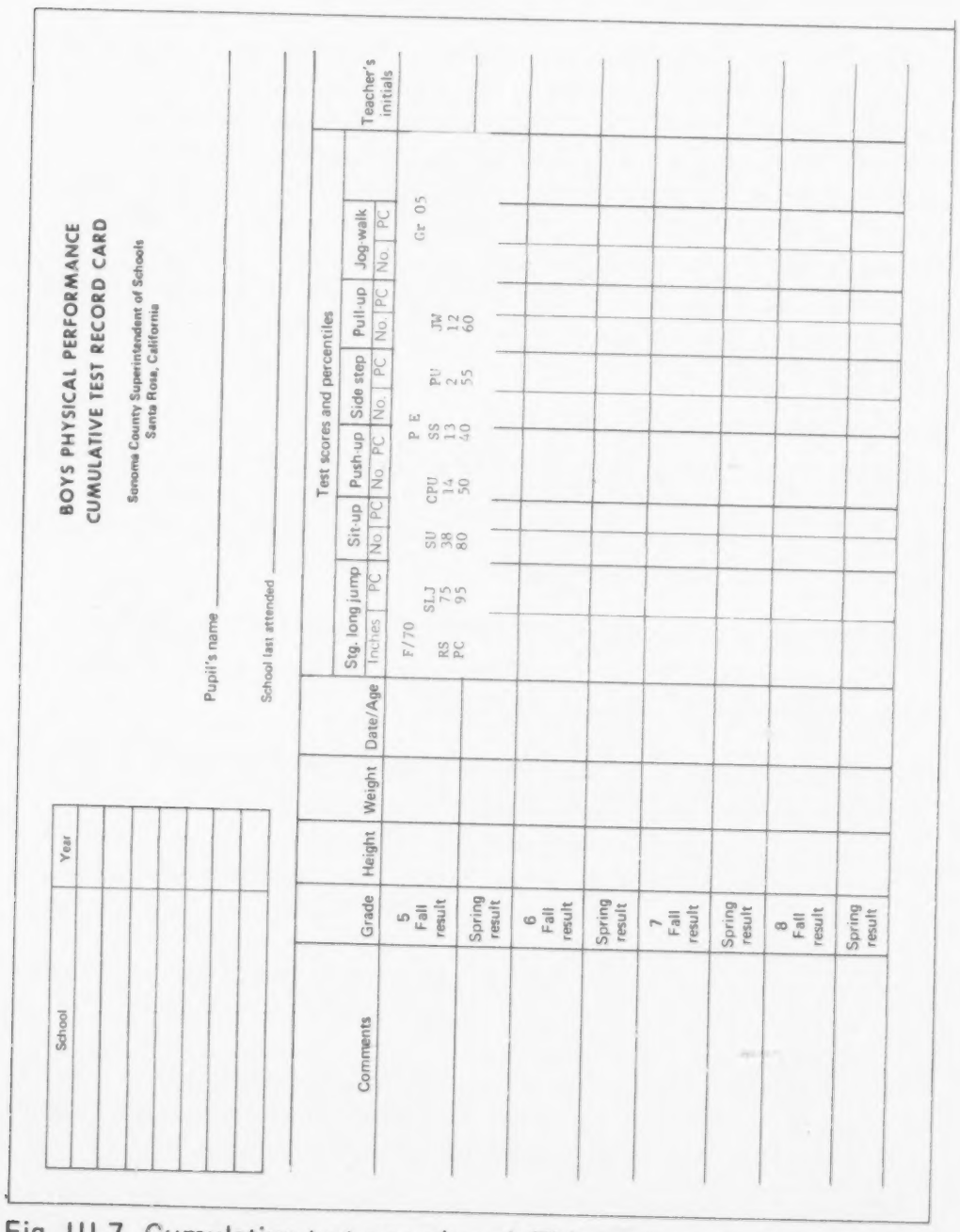


Fig. III-7. Cumulative test record card. This card can be tabulated by hand or by attaching a machine processed gummed label as illustrated in the figure. It was adapted from a form developed in the office of the Sonoma County Superintendent of Schools.

Siskiyou County Quick-Scoring Pupil Record Card

PHYSICAL PERFORMANCE TEST FOR CALIFORNIA

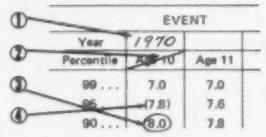
Complete information for each grade, each time the test is administered

Test Scoring Instructions

1. Give each test exactly as directed in the publication, *The Physical Performance Test for California*, 1971.
2. Record score by using the percentile tables on the reverse side of card. The age given means that the birthday for the year has been reached but the next birthday has not been reached.

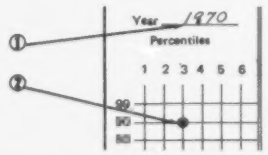
Percentile Tables

1. Place the year above the pupil's AGE column.
2. Draw a diagonal line through the pupil's age.
3. AFTER FIRST TESTING circle the raw score.
4. AFTER SECOND TESTING use a ( ) parenthesis around the raw score.



Profile Charts

1. Record the year tested in the appropriate place at the top of each percentile profile chart.
2. Using the raw score and the percentile table, record the percentile by marking a dot at the intersection of the number that indicates the test event and the percentile.
3. If the teacher wishes to mark two tests a year on the profile chart, connect the first test dots with solid lines and the second test dots with a dotted line.



Percentile Interpretation

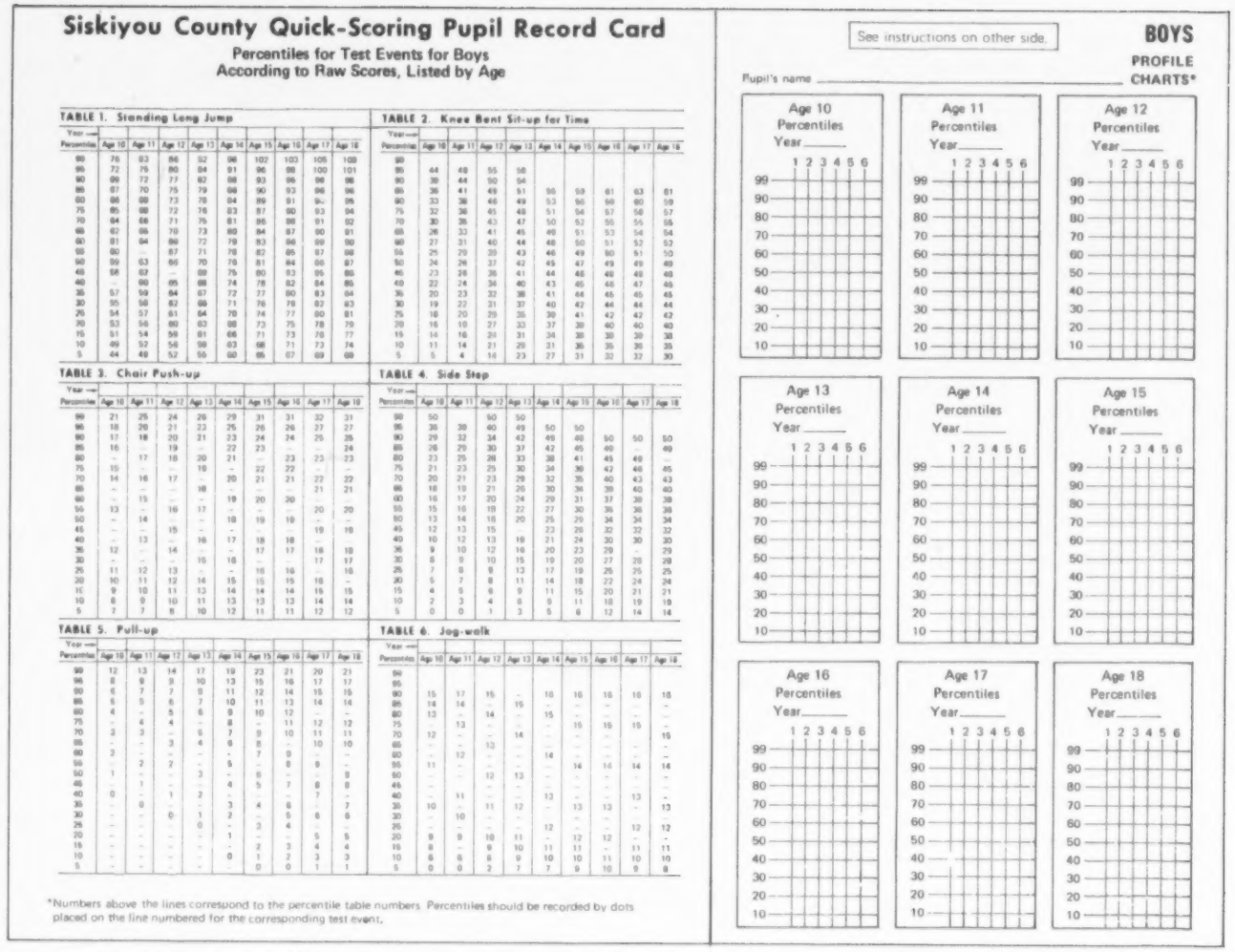
80-99 Excellent
60-79 Above average
40-59 Average
5-39 Under-developed

5th GRADE	Teacher: School: Pupil's Age: Height: ft. in. Weight:	School Year: 1st Test Date: 2nd Test Date:
6th GRADE	Teacher: School: Pupil's Age: Height: ft. in. Weight:	School Year: 1st Test Date: 2nd Test Date:
7th GRADE	Teacher: School: Pupil's Age: Height: ft. in. Weight:	School Year: 1st Test Date: 2nd Test Date:
8th GRADE	Teacher: School: Pupil's Age: Height: ft. in. Weight:	School Year: 1st Test Date: 2nd Test Date:
9th GRADE	Teacher: School: Pupil's Age: Height: ft. in. Weight:	School Year: 1st Test Date: 2nd Test Date:
10th GRADE	Teacher: School: Pupil's Age: Height: ft. in. Weight:	School Year: 1st Test Date: 2nd Test Date:
11th GRADE	Teacher: School: Pupil's Age: Height: ft. in. Weight:	School Year: 1st Test Date: 2nd Test Date:
12th GRADE	Teacher: School: Pupil's Age: Height: ft. in. Weight:	School Year: 1st Test Date: 2nd Test Date:

Fig. III-8a. Quick-scoring pupil record card. This card was adapted from a card developed for use in the office of the Sutter County Superintendent of Schools and modified in the office of the Siskiyou County Superintendent of Schools. This side of the card contains instructions for completing it and space for recording needed information.

What are the advantages and disadvantages of processing data by machine?

Advantages are: (1) machine processing is consistent in performance; (2) chance of errors is lessened; (3) development of statistical data by machine processing is far less time-consuming than it is by



Siskiyou County Quick-Scoring Pupil Record Card

Percentiles for Test Events for Boys
According to Raw Scores, Listed by Age

TABLE 1. Standing Long Jump

Year → / Percentile	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
95	76	83	86	92	96	102	103	105	108
90	72	79	80	84	91	96	98	100	101
85	69	72	77	82	88	93	96	98	98
80	67	70	75	79	86	90	93	96	96
75	66	68	73	78	84	89	91	94	95
70	65	68	72	76	83	87	90	93	94
65	64	66	71	75	81	86	88	91	92
60	62	65	70	73	80	84	87	90	91
55	61	64	69	72	79	83	86	89	90
50	60	–	67	71	78	82	85	87	88
45	59	63	66	70	76	81	84	86	87
40	58	62	65	68	75	80	83	85	86
35	57	59	64	67	74	78	82	84	85
30	55	58	62	66	72	77	80	83	84
25	54	57	61	64	71	76	79	82	83
20	53	56	60	63	70	74	77	80	81
15	51	54	58	61	68	73	75	78	79
10	49	52	56	58	66	71	73	76	77
5	44	48	52	55	60	68	71	73	74

TABLE 2. Knee Bent Sit-up for Time

Year → / Percentile	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
99									
95	44	48	55	58					
90	38	44	50	54					
85	36	41	48	51	55	59	61	63	61
80	33	38	46	49	53	56	59	60	59
75	32	36	45	48	51	54	57	58	57
70	30	35	43	47	50	52	55	56	55
65	28	33	41	45	48	51	53	54	54
60	27	31	40	44	48	50	51	52	52
55	25	29	38	43	46	49	50	51	50
50	24	28	37	42	45	47	49	49	48
45	23	26	36	41	44	46	48	48	48
40	22	24	34	40	43	45	46	47	46
35	20	23	32	38	41	44	45	45	45
30	19	22	31	37	40	42	44	44	44
25	18	20	29	35	39	41	42	42	42
20	16	18	27	33	37	39	40	40	40
15	14	16	24	31	34	38	38	38	38
10	11	14	21	28	31	36	35	36	35
5	5	4	14	23	27	31	32	32	30

TABLE 3. Chair Push-up

Year → / Percentile	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
95	21	26	24	26	29	31	31	32	31
90	18	20	21	23	25	26	26	27	27
85	17	19	20	21	23	24	24	25	25
80	16	–	19	–	22	23	–	–	24
75	–	17	18	20	21	–	23	23	23
70	15	–	–	18	–	22	22	–	–
65	14	16	17	–	20	21	21	22	22
60	–	–	–	18	–	–	–	21	21
55	–	15	–	–	19	20	20	–	–
50	13	–	16	17	–	–	–	20	20
45	–	14	–	–	18	19	19	–	–
40	–	–	15	–	–	–	–	19	19
35	12	13	–	16	17	18	18	–	–
30	–	–	14	–	–	17	17	18	18
25	–	–	–	15	16	–	–	17	17
20	11	12	13	–	–	16	16	–	16
15	10	11	12	14	15	15	15	16	–
10	9	10	11	13	14	14	14	15	15
5	7	7	8	10	12	11	11	12	12

TABLE 4. Side Step

Year → / Percentile	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
99	50	38	50	50					
95	38	38	40	49	50	50			
90	29	32	34	42	46	46	50	50	50
85	26	29	30	37	42	45	46	–	49
80	23	25	26	33	38	41	45	49	–
75	21	23	25	30	34	38	42	46	45
70	20	21	23	29	32	35	40	43	43
65	18	19	21	26	30	34	39	40	40
60	16	17	20	24	29	31	37	38	38
55	15	16	18	22	27	30	36	36	38
50	13	14	16	20	25	29	34	34	34
45	12	13	15	–	23	26	32	32	32
40	10	12	13	18	21	24	30	30	30
36	9	10	12	16	20	23	29	–	29
30	8	9	10	15	19	20	27	28	28
25	7	8	9	13	17	19	25	25	25
20	5	7	8	11	14	18	22	24	24
15	4	5	6	9	11	15	20	21	21
10	2	3	4	6	8	11	18	19	19
5	0	0	1	3	5	8	12	14	14

TABLE 5. Pull-up

Year → / Percentile	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
95	12	13	14	17	19	23	21	20	21
90	8	9	9	10	13	15	16	17	17
85	6	7	7	8	11	12	14	15	15
80	5	5	6	7	10	11	13	14	14
75	4	–	5	6	8	10	12	–	–
70	–	4	4	–	8	–	11	12	12
65	3	3	–	6	7	9	10	11	11
60	–	–	3	4	6	8	–	10	10
55	2	–	–	–	–	7	9	–	–
50	–	2	2	–	5	–	8	9	9
45	1	–	–	3	–	6	–	–	–
40	–	1	–	–	4	5	7	8	8
35	0	–	1	2	–	–	–	7	7
30	–	0	–	–	3	4	6	–	–
25	–	–	0	1	2	–	5	6	6
20	–	–	–	0	1	3	4	–	5
15	–	–	–	–	0	2	–	5	4
10	–	–	–	–	–	1	3	4	3
5	–	–	–	–	–	0	2	3	2

TABLE 6. Jog-walk

Year → / Percentile	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
99									
95	15	17	15	–	16	16	16	16	16
90	14	14	–	15	–	–	–	–	–
85	13	–	14	–	15	–	–	–	–
80	–	13	–	14	–	15	15	15	–
75	12	–	–	–	–	–	–	–	15
70	–	12	13	–	14	–	–	–	–
65	–	–	–	–	–	14	14	14	14
60	11	–	12	13	–	–	–	–	–
55	–	11	–	–	13	–	13	–	–
50	10	–	11	12	–	13	13	13	13
45	–	10	–	–	12	–	–	–	–
40	–	–	10	11	–	12	12	12	12
35	9	9	9	10	11	–	–	–	–
30	8	–	–	9	10	11	11	11	11
25	–	8	8	8	9	10	10	10	10
20	7	7	7	7	8	9	9	9	9
15	6	6	6	6	7	8	8	8	8
10	5	5	5	5	6	7	7	7	7
5	4	4	4	4	5	6	6	6	6

*Numbers above the lines correspond to the percentile table numbers. Percentiles should be recorded by dots placed on the line numbered for the corresponding test event.

See instructions on other side.

BOYS

PROFILE CHARTS*

Pupil's name _____

Age 10 Percentiles Year _____
Age 11 Percentiles Year _____
Age 12 Percentiles Year _____
Age 13 Percentiles Year _____
Age 14 Percentiles Year _____
Age 15 Percentiles Year _____
Age 16 Percentiles Year _____
Age 17 Percentiles Year _____
Age 18 Percentiles Year _____

1 2 3 4 5 6
99 90 80 70 60 50 40 30 20 10

Fig. III-8b. Quick-scoring pupil record card. This side of the card shows the percentile tables and provides space for recording the percentiles for each test event according to the age of the pupil.

hand; and (4) machine proce
cents per pupil tested.

Disadvantages are: (1) m
available for processing; (2) there may be a considerable time lapse between testing and receivi
experience in marking card
(input cards).

What are the advantages and disadvantages of processing data by hand?

Advantages are: (1) there is no lapse of time between administering and processing data if such teacher time is available; (2) immediate follow-up by school personnel involved can occur; and (3) there can be opportunity for makeup tests for absentees over a period of time.

Disadvantages are: (1) hand processing is time-consuming; (2) possibility of inaccuracies in treatment of data is greater than machine processing; and (3) hand processing is expensive when the value of teacher time is considered. However, if school funds are not available for machine processing, teacher time may be required for this task.

List of Regional Educational Data Processing Centers

Central Valley Regional Center
2314 Mariposa St.
Fresno, CA 93721
Phone: 209-268-6011, Ext. 586

Kern County Regional Center
1315 Truxtun Ave.
Bakersfield, CA 93301
Phone: 805-327-2111, Ext. 2643

Los Angeles Regional Center
155 W. Washington Blvd.
Los Angeles, CA 90015
Phone: 213-749-6911, Ext. 841

Northwest Regional Center
401 Fifth St.
Santa Rosa, CA 95401
Phone: 707-527-2237

Riverside Regional Center
4015 Lemon St.
Riverside, CA 92502
Phone: 714-787-2604

Sacramento Regional Center
6011 Folsom Blvd.
Sacramento, CA 95819
Phone: 916-454-2443

San Diego Regional Center
6401 Linda Vista Road
San Diego, CA 92111
Phone: 714-278-6400, Ext. 346

San Francisco Regional Center
135 Van Ness Ave.
San Francisco, CA 94102
Phone: 415-863-4680, Ext. 296

San Mateo Regional Center
590 Hamilton St.
Redwood City, CA 94063
Phone: 415-369-1441, Ext. 2554

Santa Clara Regional Center (RECAP)
70 W. Hedding St.
San Jose, CA 95110
Phone: 408-299-3284

Ventura Regional Center
Office of the County Superintendent
of Schools
Courthouse
Ventura, CA 93001
Phone: 805-648-6131, Ext. 2721

CHAPTER IV

Using Test Results

The Physical Performance Test is used to secure some of the information needed to accomplish the following purposes:

- Identify physically underdeveloped pupils.
- Adapt instruction to individual needs.
- Adapt the physical education program to pupils' needs.
- Appraise pupils' progress.

Some suggestions for accomplishing these purposes are presented in the answers to the questions which follow.

How are physically underdeveloped pupils identified?

Observation of a pupil's performance in any physical activity is the first step in identifying physically underdeveloped pupils. The symptoms discussed on page 25 list the conditions which merit attention. In addition to observation of a pupil's performance, school personnel should use the following procedures:

- Analyze the results of the pupil's physical examinations.
- Evaluate the pupil's growth pattern to see how he compares with the rate of growth and height and weight for his age.
- Appraise the pupil's body balance and movement to determine if the pupil has postural deviations which may restrict his achieving his best performance.
- Determine the pupil's performance level. The pupil's performance at a given age may be appraised by interpreting the results as percentile scores. If the pupil's score is at or below the 25th percentile, it may indicate physical underdevelopment. Additional information which may explain poor performance should be obtained from the nurse, counselor, or teachers. This information should include records of conditions, such as illnesses, accidents, poor eating habits, irregular growth, emotional problems, and physical handicaps.

How is instruction adapted to the individual needs of pupils?

Instruction is adapted to meet the individual needs of pupils by selecting specific activities which should assist in the removal of weaknesses identified by the results of the Physical Performance Test. Activities which will assist in the removal of identified weaknesses are listed under the specified test events:

- Pupils who do poorly in the standing long jump should be taught to accomplish the following: (1) skip rope at own tempo; (2) jump in place; and (3) perform rhythmical activities involving skipping, leaping, hopping, and jumping.
- Pupils who perform poorly in the knee bent sit-up should be taught to accomplish the following: (1) perform a variety of tumbling stunts on mat or grass; (2) hang from bar with knees raised; (3) perform a skin-the-cat on the horizontal bar; and (4) participate in weight training.
- Pupils who cannot do any type of pull-up or push-up should be taught to accomplish the following: (1) perform the crab walk and other animal walks; (2) assume a pull-up position by supporting feet on a stool, then slowly lowering self to a full hanging position and repeat; (3) perform a wheelbarrow on a mat or clean floor; (4) hang on bar, bend knees to chest, circle once to the right and once to the left, and repeat; (5) swing on the horizontal bar or ladder with arms fully extended; (6) swing on the horizontal bar or ladder with arms flexed; (7) climb a vertical pole or rope using both hands and feet; (8) travel hand-over-hand forward and backward on the bar; and (9) hang by one hand and then the other.
- Pupils who perform poorly on the side step should be taught to accomplish the following: (1) gallop freely in open space; (2) slide and change direction; (3) perform hopping and jumping patterns, such as in hopscotch or in designs made by inner tubes or hoops laid on a smooth surface; and (4) perform folk dances with skipping, sliding, or polka as the basic step.
- Pupils who perform poorly in the jog-walk should be taught to do the following: (1) play follow-the-leader over an increasingly long course; (2) perform, throughout a specified period, continuous rhythmical activities, such as vigorous folk dance, creative rhythms, and modern dance; (3) jog and run with increased emphasis on running in activities such as soccer, speed-a-way, and flag football; (4) perform track events emphasizing relays and increased distance running; and (5) perform in a variety of activities in circuit training.

How should the physical education program be adapted to meet needs of most pupils?

When the majority of pupils in a class or school perform at or below the 50th percentile in one or more of the physical performance test events, the physical education program should be critically examined, and activities in the program that contribute to the improvement of physical performance should be increased. If overall results of the class show poor performance in the area of strength, the offerings in stunts, tumbling, self-testing activities, and activities on apparatus should be increased. If overall results of the class show

poor performance in cardiorespiratory endurance, activities that require an increased length of time and distance in running, walking, and moving should be stressed. Such activities include relay races, soccer, speed-a-way, continuous rhythmical activities, and rope jumping.

When the majority of pupils in a class or school perform at or above the 75th percentile in one or two of the physical performance test events, the physical education program of activities should be examined for a balance of all instructional units. Care must be taken to provide activities which will maintain the high level of performance. Care also should be taken to increase activities which will improve performance in areas of low achievement.

Often entirely new units of instruction need to be introduced to meet the needs of certain pupils.

How should a pupil's progress be appraised?

If the Physical Performance Test is administered at regular intervals at least twice a year, it may be used as one of the measures of individual progress and achievement. The recording and interpreting of successive scores make it possible to observe the changing performance level of each pupil. Since physical performance is *one* of the objectives of physical education, other measuring devices must be used to determine if all the objectives of the program have been met. Pupils' marks must reflect their overall achievement as measured by all types of devices, such as skill tests, written tests, checklists, and others, as well as improvement as indicated by the raw scores from one administration of the Physical Performance Test to the next within one school year.

What type of progressive activities may be utilized to develop physically conditioned pupils?

After a pupil has been identified as being physically underdeveloped for his chronological age, growth pattern, health record, and performance on one or more events in the Physical Performance Test, a program of physical education must be developed to meet his identified needs. Meeting each pupil's identified needs may mean: (1) a complete revision of the entire physical education program in a school or district; (2) development of special or new units of instruction; and/or (3) revision of the methods of instruction or emphasis on activities which develop specific groups of muscles.

In order to provide a program meeting specific needs, the teacher may find it necessary to provide an individualized program with a pupil at school and at home, with a small group or squad who have comparable deficiencies, or with the entire class. A list of activities which can be used to meet specific physical development needs follows. The activities are grouped according to the primary elements of physical performance that are tested.

Activities for developing arm, shoulder girdle, and upper back muscular strength and endurance. The activities, progressing from a slight to an increased demand on muscles, are listed under headings which indicate the equipment needed for the activities which follow them. (Mats, ropes, and horizontal bars are needed equipment.)

- On floor near mat (Body is supported on the floor.)
    1. Walk on all fours the length of the mat.
    2. Run on all fours the length of the mat.
    3. Perform a seal walk around the mat. Drag legs along the floor as the arms and hands move the body.
    4. Perform a partner pull-up. One person stands astride a person who is lying on his back with his head and shoulders between the legs of the standing partner. Person on the floor raises arms and interlocks hands and wrists with the partner above. Pupil lying on the floor then pulls up until his chest touches the clasped hands or wrists while his body is kept in a straight line with the weight on his heels.
- On mat
    5. Perform a frog-stand or tip-up. Squat so that hands are flat on the floor, somewhat turned in, elbows are inside thighs, pressed hard against knees, and feet are close to hands. Lean forward slowly and transfer the weight of the body onto arms and hands, and at the same time, lift toes from the floor. Hold this position for from 5 to 20 counts. Head should be held up to get good balance. Increase time in which position can be be held.
    6. Perform a handstand with support for feet. Stand facing a partner. Place hands on the floor about shoulder width apart. Fully extend arms and legs; raise head well up. Try to throw feet so that they are caught by partner. Hold position by pointing toes as feet balance over raised head. (The handstand may be taught from a position of both hands and one foot on the floor. The free leg then, by a swing, pulls both legs up into the air. Many children can do a handstand easily from a standing position.)
- On horizontal bar (Entire body must be held against gravity pull.)
    7. Hang on a bar with back of hands toward face and body hanging with no support for a count of one, and drop to an easy landing by bending ankles, knees, and hips.
    8. Hang on a bar with back of hands toward face and with body extended for increasingly longer counts (10 to 30); rest and relax between attempts.
    9. Hang on a bar with legs extended and back of hands toward face; bring knees up to chest and lower to starting position.

10. Hang with arms bent and with back of hands toward face; hold chin at bar level until arms tire, and then lower body.
11. Perform a sloth-hang, also called ankle pull-up. Grab one end of the horizontal bar with both hands, swing the body up, and cross legs over the other end of the bar. While hanging with legs straight along the bar, pull chin up to bar, lower, and repeat alternating sides of head to bar. Lower legs first when dismounting and do so before tiring.
12. Perform at least two "chins" by pulling up with palms of hands toward face.
13. Perform a pull-up with the elbows slightly bent.

- On ropes

14. Climb rope for 2 to 5 feet, using both legs and arms. Attempt to climb 10 feet.
15. Climb by holding onto two ropes with just the hands.
16. Climb one rope with hands only for at least 10 feet.

Activities for developing abdominal strength and endurance. The activities, progressing from a slight to an increased demand on muscles, are listed under headings which indicate the equipment needed for the activities which follow them. (Mats and horizontal bars are needed.)

- On floor near mat

1. Perform a shoulder stand. Lie on back. Lead with feet and roll backwards until hips are above shoulders and legs are extended vertically as high as they can reach with toes pointed upward. Maintain inverted body balance by bracing hands against body at the waist or a little below and resting upper arms on the floor parallel with body. Weight of body is carried on shoulders, neck, and elbows. Hold this position for several seconds and then return to original position by bending knees to chest, removing hand support, and slowly rolling from rounded back to pelvis, finally allowing legs to rest in place. Repeat until able to perform with no hand support.
2. Perform an up and reach. Lie on back with arms extended beyond head. In one continuous movement lift arms, reach forward, and sit up. At the same time pull knees close to chest inside outstretched arms. Return to the starting position and continue to sit up and lie down in a rhythmical movement.
3. Perform an abdominal curl. Lie on back with hands on thighs and legs extended flat on floor, toes held upright. Slowly raise head, shoulders, and upper trunk; curl forward to a half sitting position; slowly uncurl; and assume starting position.

55

4. Perform a V-sit. Lie on back with legs straight and arms out from shoulders. Come to a position where body is balanced on the buttocks with the trunk and legs making a "V." Arms, stretched out from the shoulders, are used to balance. Return slowly to position. Repeat several times, and try to hold the "V" position for a longer period during each performance.

- On horizontal bar
  5. Perform a skin-the-cat. Jump upward, grasp the bar with back of hands toward face, and let body hang straight. Pull with arms, and, at the same time, bring both feet between arms and under the bar. Continue to turn body between arms as far as possible. Release bar and land lightly on feet.
  6. Perform a skin-the-cat over and back. Perform a skin-the-cat to the point at which the bar is generally released, but instead of releasing the bar, pull body back between arms with knees bent and close to chest. (If the bar is low, a child may push off the ground and then pull with arms to gain the correct position.)
  7. Perform a flip pancake forward. Grasp the bar with back of hands toward face and hands spread to a width a little greater than that of body. Jump to a front leaning rest position with thighs resting on the bar and arms and legs extended. Adjust hands so that palms are toward face. Curl over the bar, bend knees, continue to roll over the bar, and land on feet.
  8. Perform a pull over or hip swing up. Face and grasp bar with back of hands toward face. Swing legs backward and forward, and on forward swing bend arms and kick with one leg to bring hips to rest on bar with feet together. Hold a front-support position.

- On mat
  9. Perform a controlled headstand. Place hands and head on the mat so that they mark the points of an equilateral triangle. Move feet slowly toward face and raise hips to a position over shoulders. Raise one leg after the other or both legs at the same time until hips and knees, ankles and toes can be held straight in vertical position. Return to the surface by bending hips and lowering legs so that the body weight can be taken on feet. (When a student is learning to perform the controlled headstand, another student, called a spotter, stands with the side of his foot placed against the head of the performer on the mat. The side of the spotter's body provides a surface against which the performer's body may rest momentarily if the

performer loses his balance while executing the head-stand.)

10. Perform a hand knee shoulder stand. Number 1 or bottom man must have strong shoulder muscles. He lies on back with knees bent. Number 2 man stands between his knees and as close to the bent hips of number 1 as he can. Three spotters should be used while this stunt is being learned – one to stand at each side and one at the head of number 1. Number 2 places hands either on the knees or thighs of number 1, according to the length of his arms, as he leans forward to allow his shoulders to be caught by the hands of number 1. The elbows of number 2 must not bend, and number 1 must be careful to get a comfortable grasp on number 2 man's shoulders. Number 2, by swinging one leg upward, raises both legs over his head. If number 2 remembers to point his toes and keep his head raised, he will have a perfect balance on the hands and knees of number 1.

Activities for developing leg strength, speed, and power. The activities, progressing from a slight to an increased demand on muscles, are listed under headings which indicate the equipment needed for the activities which follow them. (Long ropes, individual ropes, and mats are needed.)

- With long rope (Rope is held by two people.)
  1. Perform a rock the cradle. Lead a group in running through a rope as it is swung back and forth. Run through as the rope reaches the height of its arc or as it reaches the lowest point in its arc. More than one can jump at the same time.
  2. Perform high water. Take a turn jumping into and out of a fully turned long rope. (After each jumper has had a turn, the rope is raised two or three inches for each jump.)
- With individual rope
  3. Skip with rope moving forward, moving in a circle, and remaining in a specified area.
  4. Jump with rope slowly, quickly, and changing directions.
  5. Perform rythms, such as animal walks and locomotor skills, accompanied by recording or drum.
- On mat
  6. Perform an ankle pull. Partners take a position on their hands and knees beside each other but facing in opposite directions. Each pupil holds his partner's nearest ankle with his hand and tries to crawl forward dragging the partner along. The pupil reaching the opposite side of the mat first is the winner. (Pupils should be matched according to size.)

7. Play leap frog. Number 1 player bends forward by supporting his hands on knees and ducking his head. Number 2 jumps over number 1 by placing his hands on number 1 man's upper back and jumping. Repeat four times, alternating jumpers.

- On play area

8. Play last man out. By running in a squad of six to eight, pupils can cover long distances by concentrating on what they are doing rather than how long they are running. Jogging in file, one person behind the other, pupils start to a specific destination, and immediately the leader shouts "go." At this command the last person in the line passes the other pupils and then becomes the leader. Immediately upon becoming the leader, this person shouts "go," and the next person passes everyone until he or she becomes the leader. This person shouts "go," and the next person runs ahead to become leader. This process is continued until the squad has reached its destination and has returned to the point of origin.

Activities for developing agility, balance, and coordination. The activities which follow are given to develop agility, balance, and coordination. (No equipment is needed.)

1. Balance body over a wide stationary base – stand in a side stride position with feet 12 to 14 inches apart. Bend knees easily to lower body to floor, thus lowering the center of gravity. Shift weight slowly from one foot to the other. Then balance first on one foot and then the other.
2. Change directions by sliding first four slides to the left and back four slides to the right, three slides to left and three back to the right, two slides to the left and two back to the right. Perform the action slowly at first and gradually increase in tempo. (An exciting variation is achieved by performing the slide step in a column of three or four people, each of whom has his hands on the hips of person in front of him.)
3. Skip in own floor pattern and change directions frequently.
4. Play games involving changing directions.

Activities for developing cardiorespiratory endurance. The activities which follow are given to develop cardiorespiratory endurance. The length of time for the activity should be increased gradually, and the periods of rest between each activity should be decreased gradually. (No equipment is needed for the first four activities; a mat is needed for the last activity listed.)

1. Run in place for a count of 20 and then walk for 20 steps. Gradually increase the running steps to 40 as the walking steps are decreased. Rest and repeat.

2. Run in place by lifting knees as high as waist on each step. Carry body weight on front foot and toes. Each arm should swing rhythmically at the side of the body. Perform the exercise first for a half minute and gradually increase the time until three or four minutes duration has been reached.
3. Play follow-the-leader. Lead a group through the following: run around the gym or play area, jump across each mat, jog around the horizontal bar and to the far end of the area, and jump (long) rope twice before returning to starting place.
4. Jump rope with individual rope for one minute, two minutes, three minutes, four minutes.
5. Perform a monkey roll or three man weave. Take position on the mat for monkey roll. Three performers take prone positions on the mat, backs straight and weight on hands and toes with about three feet between each person. Number 2 (in the center) drops down and rolls toward number 1. As number 2 rolls, number 1 gets to his knees and springs from the mat with hands and feet and dives sideways over number 2. The fall should be broken with the hands and feet (still in prone position); number 1 immediately drops down and rolls toward number 3. As number 1 rolls toward number 3, number 3 springs over number 1, drops to the mat, and rolls toward number 2. Number 2 then dives sideways over number 3. This shuttle process is continued for three or four complete series.

CHAPTER V

Using Percentiles and Statistical Information

Percentiles for the six test events of the Physical Performance Test, adopted by the California State Board of Education in 1970,are presented in tables 1 through 12. Included in the tables of percentiles for each event for boys and for girls, listed according to chronological age, are the following: the number tested (N), mean, median, first quartile (Q_1), third quartile (Q_3), and the standard deviation.

The percentile tables are designed to give the teacher some quick interpretation of relative score values. Thus, for each percentile shown, the raw score which is closest to the percentile is recorded in the tables. The matching of the percentiles with the raw score cumulative percent is often inexact. For example in Table 7, which shows the results of the standing long jump for girls, a score of 60 made by an eleven-year-old girl is given at the 60th percentile; whereas, actually the cumulative percent of cases is 58.1. And since 58.1 is closer to 60 than it is to any other number in the five-point percentile scale, the score of 60 is placed at the 60th percentile.

Sometimes the same raw score extends over two or more of the five-point intervals on the percentile scale. In such cases the raw score is reported at the percentile which is closest to the cumulative percent. For example, consider the standing long jump results for eleven-year-old girls as shown in Table 7. A raw score of 58 actually reflects a cumulative percent of 47.7 and is assigned to the 50th percentile. The next lower raw score of 57 represents a cumulative percent of 41.9 and is placed in the 40th percentile. Such assignment leaves the 45th percentile with no distinctive raw score,and the dash (–) indicates that the 45th percentile value is somewhere between 57 and 58. The presence of a dash (–) in a column simply means that a whole number raw score has no sharply defined meaning in terms of five-point percentile intervals.

Percentile interpretations of specific raw scores should be taken as rough indicators, although they are accurate within one or two percentage points. In the actual computation an *exact* percentile was provided each raw score, but the data have been presented in five-point intervals in these tables for ease of use. Consequently, slight differences may occur in these tables between the median which was calculated and the score at the 50th percentile. Such differences are attributable to the computation rule used to calculate the median in the entire distribution and the procedure followed for

reporting the percentiles in the tables from the cumulative percents. The computation rule that was utilized was the one that estimated the exact point in the score interval around which 50 percent of the cases would be distributed on each side. On the other hand, the score at the 50th percentile shown in the tables is simply the discrete score that, in a cumulative distribution, is closest to 50 percent of the cases. Differences in these tables between the calculated first quartile (Q_1), and the score at the 25th percentile and between the calculated third quartile (Q_3), and the score at the 75th percentile have a similar explanation.

The scores for the pull-up for both boys and girls are irregular. However, though presented here in standard format, the distribution for the pull-up for girls is so irregular that the percentile scores lose much of their utility. Perhaps the extraordinarily low performance figures are due to lack of practice in this particular task and to a lack of emphasis upon it in many programs. For teachers who need a gross comparison statistic, median raw scores for the different ages may serve as a rough guide. For example, girls who score one or more pull-ups are technically above the median; for those who cannot accomplish a single pull-up, there is no corresponding percentile. The same is true for boys, ages ten through fourteen.

In addition to irregular raw scores, a very few of the extremely high scores appearing in the original, processed results were suspect and have been removed. Although professional standards of data control were maintained throughout data collection, these few "impossible" entries were recorded and processed. When they were discovered some weeks later, it was not feasible to reconstruct or "correct" them. In all likelihood these errors were human recording mistakes that occurred at the test site and simply were not recognized before processing. The omission of these raw scores should not detract from the general usability of the percentiles.

In four test events impossible scores were reported: the jog-walk, the knee bent sit-up, the push-up for boys, ages fourteen through eighteen, and the side step for girls, age twelve. The records submitted for the jog-walk showed that some pupils' performance of the jog-walk exceeded present world records. Consequently, it must be assumed that some mistakes were made either in the testing phase or during the processing of the raw scores. For those jog-walk percentiles of 95 and above for boys and 99 for girls, the raw score norms have been eliminated. Similar mistakes must have occurred in the sit-up for boys. In this test event the raw scores for the 99th percentile for boys in all ages and scores in the 90th and 95th percentiles for boys, ages fourteen through eighteen, are eliminated in this final report.

A third anomaly, and one which is less serious than that mentioned above, concerns the chair push-up for boys. Although instructions called for push-ups to be stopped after the fiftieth

performance, some pupils were allowed to continue past this point. This resulted in raw scores for boys in the 99th percentile and the 95th percentile, ages sixteen through eighteen, to be computed as above 50 push-ups; these values, too, are not reported for those ages for boys. The raw score for twelve-year-old girls in the side step at the 99th percentile is not comparable to the other scores, and it has been eliminated.

The major purpose for administering the Physical Performance Test is to determine the strengths and weaknesses of pupils in order that physical education programs, instructional methods, and emphases may be changed to meet each pupil's needs as identified by the test results. Improvement of individual performance is very important to both pupil and teacher. Use of the norms is not necessary for individual pupil measurement and evaluation, but teachers and administrators should find them helpful in evaluating the programs of entire school districts or one school in comparison to the performance of boys and girls, ages ten through eighteen, in April and May, 1970, in California.

Percentile Tables

Percentiles for the six test events for boys and for girls according to chronological age and length or number of performances are presented in the tables 1 through 12.

Sampling Plan and Data Gathering Procedure

The purpose of the sampling plan was to define a practical probability sample for establishing Physical Performance Test norms in California public schools. A probability sample is a sample for which the sampling errors can be calculated from probability theory and for which the biases of selection are virtually eliminated, because the members of the sample are selected by an automatic and presumably unbiased procedure. Each element in the sample must have had an assignable probability of coming into the sample, and the automatic sampling process must reflect those probabilities.

The sampling universe in this study was taken to be the complete set of pupils, ages ten through eighteen, enrolled in public schools in the state of California in the spring of 1970. The sampling frame of the study was the complete set of public schools operating in the state during 1970. A primary reason for selecting the school as the sampling frame is that testing can be more conveniently administered on a school class basis rather than on an individual basis. Actually, there is not, in any one place, a list of pupils that defines the universe, nor is there anywhere a list of schools which shows each and every pupil as being in just one class. If such lists had been available, then sampling procedures could have utilized them. The plan chosen

Continued on page 66.

Table 1

Percentiles for the Standing Long Jump for Boys According to the Length of the Jump as Measured in Inches, Listed by Chronological Age

Percentile	Length of jump in inches, according to age*								
	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
99	76	83	86	92	98	102	103	105	108
95	72	75	80	84	91	96	98	100	101
90	69	72	77	82	88	93	95	98	98
85	67	70	75	79	86	90	93	96	96
80	66	69	73	78	84	89	91	94	95
75	65	68	72	76	83	87	90	93	94
70	64	66	71	75	81	86	88	91	92
65	62	65	70	73	80	84	87	90	91
60	61	64	69	72	79	83	86	89	90
55	60	–	67	71	78	82	85	87	88
50	59	63	66	70	76	81	84	86	87
45	58	62	–	69	75	80	83	85	86
40	–	60	65	68	74	78	82	84	85
35	57	59	64	67	72	77	80	83	84
30	55	58	62	66	71	76	79	82	83
25	54	57	61	64	70	74	77	80	81
20	53	56	60	63	68	73	75	78	79
15	51	54	59	61	66	71	73	76	77
10	49	52	56	59	63	68	71	73	74
5	44	49	52	55	60	65	67	69	69
N‡	1069	1104	1199	1277	1206	1132	1232	1178	1084
Mean	59.3	62.7	66.7	70.4	76.2	80.9	83.5	86.2	86.9
Median	60.3	63.5	67.3	71.5	77.4	81.8	84.9	87.2	88.0
Q_1	55.0	57.9	61.9	65.3	70.8	75.3	78.2	80.8	82.0
Q_3	65.6	68.6	72.7	77.2	83.9	88.0	90.8	93.5	94.8
Standard deviation	9.2	8.4	9.0	10.5	11.1	10.7	11.3	10.4	11.2

*The age given means that the birthday for the year has been reached, but the next birthday has not been reached upon completion of the test. The pupil's age at the completion of the test is the age that is recorded for that testing period.

‡The figures given in the line labeled "N" indicate the number of pupils in each age group who were tested for this event.

Table 2

Percentiles for the Knee Bent Sit-up for Time for Boys According to the Number of Sit-ups Performed in 60 Seconds, Listed by Chronological Age

Percentile	Number of sit-ups,* according to age‡								
	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
99									
95	44	49	55	58					
90	39	44	50	54					
85	36	41	49	51	55	59	61	63	61
80	33	38	46	49	53	56	59	60	59
75	32	36	45	48	51	54	57	58	57
70	30	35	43	47	50	52	55	55	55
65	28	33	41	45	49	51	53	54	54
60	27	31	40	44	48	50	51	52	52
55	25	29	39	43	46	49	50	51	50
50	24	28	37	42	45	47	49	49	49
45	23	26	36	41	44	46	48	48	48
40	22	24	34	40	43	45	46	47	46
35	20	23	32	38	41	44	45	45	45
30	19	22	31	37	40	42	44	44	44
25	18	20	29	35	39	41	42	42	42
20	16	19	27	33	37	39	40	40	40
15	14	16	24	31	34	38	39	39	38
10	11	14	21	29	31	35	35	36	35
5	5	4	14	23	27	31	32	32	30
N§	1069	1104	1199	1277	1206	1132	1232	1178	1084
Mean	25.1	28.7	36.6	41.4	45.1	48.1	49.8	50.4	49.5
Median	25.1	28.9	38.1	42.8	45.8	48.4	49.9	50.4	50.4
Q_1	18.8	21.3	30.1	36.1	40.0	41.6	42.8	42.7	42.7
Q_3	32.5	37.2	45.5	48.8	51.9	54.8	57.0	58.7	57.6
Standard deviation	12.1	13.6	12.9	11.6	12.1	12.3	12.7	13.2	13.3

*See page 52 for an explanation of the omission of raw scores.

‡The age given means that the birthday for the year has been reached, but the next birthday has not been reached upon completion of the test. The pupil's age at the completion of the test is the age that is recorded for that testing period.

§The figures given in the line labeled "N" indicate the number of pupils in each age group who were tested for this event.

Table 3

Percentiles for the Chair Push-up for Boys According to the Number of Push-ups Performed Listed by Chronological Age

Percentile	Number of push-ups,* according to age‡								
	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
99	50		50	50					
95	36	39	40	49	50	50			
90	29	32	34	42	49	49	50	50	50
85	26	29	30	37	42	45	49	–	49
80	23	25	28	33	38	41	45	49	–
75	21	23	25	30	34	39	42	46	45
70	20	21	23	29	32	35	40	43	43
65	18	19	21	26	30	34	39	40	40
60	16	17	20	24	29	31	37	39	39
55	15	16	18	22	27	30	35	36	36
50	13	14	16	20	25	29	34	34	34
45	12	13	15	–	23	26	32	32	32
40	10	12	13	19	21	24	30	30	30
35	9	10	12	16	20	23	29	–	29
30	8	9	10	15	19	20	27	28	28
25	7	8	9	13	17	19	25	25	25
20	5	7	8	11	14	18	22	24	24
15	4	5	6	9	11	15	20	21	21
10	2	3	4	6	9	11	18	19	19
5	0	0	1	3	5	6	12	14	14
N§	1069	1104	1199	1277	1206	1132	1232	1178	1084
Mean	15.4	17.0	18.5	22.9	26.7	29.1	34.0	35.7	35.4
Median	14.1	15.3	17.1	21.0	25.5	29.4	34.9	35.2	35.1
Q_1	7.5	9.2	10.4	13.9	17.5	20.4	25.5	26.3	26.2
Q_3	21.8	23.9	25.6	31.1	35.3	39.7	43.0	46.6	46.3
Standard deviation	11.3	12.0	12.1	13.2	14.4	14.0	13.9	14.4	13.7

*See page 52 for an explanation of the omission of raw scores.

‡The age given means that the birthday for the year has been reached, but the next birthday has not been reached upon completion of the test. The pupil's age at the completion of the test is the age that is recorded for that testing period.

§The figures given in the line labeled "N" indicate the number of pupils in each age group who were tested for this event.

Table 4

Percentiles for the Side Step for Boys According to the Number of Lines Crossed or Touched, Listed by Chronological Age

Percentile	Number of lines crossed or touched, according to age*								
	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
99	21	25	24	26	29	31	31	32	31
95	18	20	21	23	25	26	26	27	27
90	17	18	20	21	23	24	24	25	25
85	16	–	19	–	22	23	–	–	24
80	–	17	18	20	21	–	23	23	23
75	15	–	–	19	–	22	22	–	–
70	14	16	17	–	20	21	21	22	22
65	–	–	–	18	–	–	–	21	21
60	–	15	–	–	19	20	20	–	–
55	13	–	16	17	–	–	–	20	20
50	–	14	–	–	18	19	19	–	–
45	–	–	15	–	–	–	–	19	19
40	–	13	–	16	17	18	18	–	–
35	12	–	14	–	–	17	17	18	18
30	–	–	–	15	16	–	–	17	17
25	11	12	13	–	–	16	16	–	16
20	10	11	12	14	15	15	15	16	–
15	9	10	11	13	14	14	14	15	15
10	8	9	10	11	13	13	13	14	14
5	7	7	8	10	12	11	11	12	12
N‡	1069	1104	1199	1277	1206	1132	1232	1178	1084
Mean	13.2	14.4	15.6	17.0	18.5	19.3	19.4	20.0	19.9
Median	13.8	15.1	16.3	17.6	18.9	19.7	20.0	20.4	20.5
Q_1	11.7	12.6	13.7	15.2	16.4	16.8	16.8	17.5	17.4
Q_3	15.8	17.2	18.6	20.1	21.4	22.6	22.9	23.4	23.5
Standard deviation	4.0	4.4	4.8	4.1	4.3	5.0	4.8	5.0	5.0

*The age given means that the birthday for the year has been reached, but the next birthday has not been reached upon completion of the test. The pupil's age at the completion of the test is the age that is recorded for that testing period.

‡The figures given in the line labeled "N" indicate the number of pupils in each age group who were tested for this event.

Table 5

Percentiles for the Pull-up for Boys According to the Number of Pull-ups Performed, Listed by Chronological Age

Percentile	Number of pull-ups, according to age*								
	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
99	12	13	14	17	19	23	21	20	21
95	8	9	9	10	13	15	16	17	17
90	6	7	7	9	11	12	14	15	15
85	5	5	6	7	10	11	13	14	14
80	4	–	5	6	9	10	12	–	–
75	–	4	4	–	8	–	11	12	12
70	3	3	–	5	7	9	10	11	11
65	–	–	3	4	6	8	–	10	10
60	2	–	–	–	–	7	9	–	–
55	–	2	2	–	5	–	8	9	–
50	1	–	–	3	–	6	–	–	9
45	–	1	–	–	4	5	7	8	8
40	0	–	1	2	–	–	–	7	–
35	–	0	–	–	3	4	6	–	7
30	–	–	0	1	2	–	5	6	6
25	–	–	–	0	–	3	4	–	–
20	–	–	–	–	1	–	–	5	5
15	–	–	–	–	–	2	3	4	4
10	–	–	–	–	0	1	2	3	3
5	–	–	–	–	–	0	0	1	1
N†	1069	1104	1199	1277	1206	1132	1232	1178	1084
Mean	2.5	2.8	3.0	4.0	5.6	7.0	8.2	9.0	9.2
Median	1.9	2.4	2.7	3.8	5.5	6.9	8.4	9.3	9.8
Q_1	.7	.7	.9	1.4	2.7	4.0	5.3	6.3	6.4
Q_3	4.4	4.8	4.0	6.5	8.9	10.4	11.6	12.5	12.6
Standard deviation	3.1	3.3	3.4	3.8	4.2	4.7	4.7	4.7	4.9

*The age given means that the birthday for the year has been reached, but the next birthday has not been reached upon completion of the test. The pupil's age at the completion of the test is the age that is recorded for that testing period.

†The figures given in the line labeled "N" indicate the number of pupils in each age group who were tested for this event.

Table 6

Percentiles for the Jog-walk for Boys According to the Number of 110-yard Segments Completed, Listed by Chronological Age

Percentile	Number of 110-yard segments completed,* according to age†								
	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
99									
95									
90	15	17	15	–	16	16	16	16	16
85	14	14	–	15	–	–	–	–	–
80	13	–	14	–	15	–	–	–	–
75	–	13	–	–	–	15	15	15	–
70	12	–	–	14	–	–	–	–	15
65	–	–	13	–	–	–	–	–	–
60	–	12	–	–	14	–	–	–	–
55	11	–	–	–	–	14	14	14	14
50	–	–	12	13	–	–	–	–	–
45	–	–	–	–	–	–	–	–	–
40	–	11	–	–	13	–	–	13	–
35	10	–	11	12	–	13	13	–	13
30	–	10	–	–	–	–	–	–	–
25	–	–	–	–	12	–	–	12	12
20	9	9	10	11	–	12	12	–	–
15	8	–	9	10	11	11	–	11	11
10	6	8	8	9	10	10	11	10	10
5	0	0	2	7	7	9	10	9	8
N§	1069	1104	1199	1277	1206	1132	1232	1178	1084
Mean	11.5	12.2	12.2	12.9	13.4	13.8	14.0	13.7	13.8
Median	12.0	12.5	13.0	14.0	14.5	14.6	14.8	14.7	14.7
Q_1	10.3	10.6	11.2	12 2	12.8	13.1	13.4	13.0	13.1
Q_3	13.6	14.1	14.5	15.2	15.7	16.0	16.0	15.9	16.1
Standard deviation	5.5	5.5	4.2	3.6	4.0	3.5	3.3	3.5	3.0

*See page 52 for an explanation of the omission of raw scores.

†The age given means that the birthday for the year has been reached, but the next birthday has not been reached upon completion of the test. The pupil's age at the completion of the test is the age that is recorded for that testing period.

§The figures given in the line labeled "N" indicate the number of pupils in each age group who were tested for this event.

Table 7

Percentiles for the Standing Long Jump for Girls According to the Length of the Jump as Measured in Inches, Listed by Chronological Age

Percentile	Length of jump in inches, according to age*								
	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
99	72	79	80	85	85	87	86	84	87
95	68	71	75	79	79	79	79	78	80
90	65	69	72	75	76	76	76	76	76
85	63	67	71	73	74	74	74	74	74
80	62	65	69	72	73	72	72	72	72
75	61	64	68	70	71	71	71	71	71
70	60	63	66	69	70	70	70	70	70
65	59	62	65	68	68	69	68	69	69
60	58	60	64	67	67	68	67	68	68
55	57	59	63	65	66	66	66	67	67
50	56	58	62	64	65	65	65	66	65
45	55	–	61	63	64	64	64	65	–
40	54	57	60	62	63	63	63	64	64
35	53	56	59	61	62	62	62	63	62
30	52	54	58	60	61	61	61	61	61
25	51	53	56	59	60	60	60	60	60
20	49	52	55	57	58	58	58	59	58
15	48	50	53	56	56	57	57	57	57
10	46	48	51	53	54	54	54	54	54
5	44	45	47	50	50	50	51	50	50
N‡	1060	1102	1148	1164	1115	1112	1145	1128	1089
Mean	55.9	59.0	62.2	64.8	65.2	65.4	65.4	65.6	65.7
Median	56.7	59.4	63.2	65.3	65.6	66.3	65.9	66.5	66.4
Q_1	51.6	54.3	57.2	59.9	60.8	60.6	60.5	60.8	60.6
Q_3	61.7	64.9	68.8	71.1	72.4	72.2	72.0	72.2	72.2
Standard deviation	8.4	9.6	9.0	10.1	10.4	9.8	9.3	9.2	9.8

*The age given means that the birthday for the year has been reached, but the next birthday has not been reached upon completion of the test. The pupil's age at the completion of the test is the age that is recorded for that testing period.

‡The figures given in the line labeled "N" indicate the number of pupils in each age group who were tested for this event.

Table 8

Percentiles for the Knee Bent Sit-up for Time for Girls According to the Number of Sit-ups Performed in 60 Seconds, Listed by Chronological Age

Percentile	Number of sit-ups, according to age*								
	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
99	50	51	50	53	52	54	52	50	51
95	39	42	44	46	47	47	45	45	46
90	35	37	40	42	43	43	42	42	42
85	33	35	38	40	41	41	40	40	41
80	31	33	36	38	39	39	39	39	39
75	29	31	35	37	38	38	37	38	38
70	28	29	33	35	36	36	36	36	36
65	26	28	32	34	35	35	35	35	35
60	25	26	31	33	34	34	34	34	34
55	24	24	30	32	33	32	32	33	33
50	22	23	29	31	32	31	31	32	32
45	21	21	28	30	30	30	30	30	31
40	19	20	26	29	29	29	29	29	30
35	18	19	25	27	28	28	28	28	29
30	17	18	23	26	26	26	26	27	27
25	15	16	21	24	25	25	25	25	25
20	14	15	20	23	23	23	24	24	23
15	12	13	18	21	21	21	21	21	21
10	10	11	15	19	18	19	18	19	19
5	7	7	10	14	13	13	13	13	15
N‡	1060	1102	1148	1164	1115	1112	1145	1128	1089
Mean	23.2	24.1	28.4	30 8	31.4	31.4	31.0	31.4	31.5
Median	23.1	23.6	29.9	31.6	32.5	32.1	32.1	32.7	32.6
Q_1	16.3	17.4	22.4	25.3	25.6	25.7	25.7	25.0	25.9
Q_3	30.3	31.8	35.8	37.5	38.8	39.0	38.2	38.8	38.8
Standard deviation	11.0	11.1	10.5	10.0	10.3	10.3	10.0	9.9	9.9

*The age given means that the birthday for the year has been reached, but the next birthday has not been reached upon completion of the test. The pupil's age at the completion of the test is the age that is recorded for that testing period.

‡The figures given in the line labeled "N" indicate the number of pupils in each age group who were tested for this event.

Table 9

Percentiles for the Chair Push-up for Girls According to the Number of Push-ups Performed Listed by Chronological Age

Percentile	Number of push-ups, according to age*								
	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
99	45	46	40	35	36	33	35	25	38
95	25	26	24	21	21	19	17	18	20
90	20	20	19	17	17	15	12	14	15
85	17	16	15	14	14	11	10	11	12
80	14	14	12	12	12	10	9	9	10
75	12	12	11	10	10	9	8	8	9
70	11	11	10	9	9	8	6	6	7
65	10	10	9	8	8	6	5	–	6
60	9	9	7	7	6	5	–	5	5
55	8	8	6	6	5	–	4	4	–
50	7	6	5	5	–	4	3	3	4
45	6	5	4	4	4	3	–	–	3
40	5	4	–	–	3	–	2	2	–
35	4	–	3	3	2	2	1	–	2
30	3	3	2	2	–	–	–	1	–
25	–	2	–	–	1	1	0	–	1
20	2	1	1	1	–	0	–	0	0
15	1	–	0	0	0	–	–	–	–
10	0	0	–	–	–	–	–	–	–
5	–	–	–	–	–	–	–	–	–
N‡	1060	1102	1148	1164	1115	1112	1145	1128	1089
Mean	9.4	9.1	8.2	7.6	7.2	6.4	5.5	5.5	6.4
Median	7.8	7.4	6.1	6.0	5.6	4.9	4.0	3.0	4.7
Q_1	3.5	2.9	2.5	2.5	2.1	2.0	1.3	1.5	1.8
Q_3	13.3	12.9	11.6	11.2	11.1	9.9	8.4	8.8	9.5
Standard deviation	9.3	9.7	9.0	7.8	7.5	7.7	7.3	5.9	7.7

*The age given means that the birthday for the year has been reached, but the next birthday has not been reached upon completion of the test. The pupil's age at the completion of the test is the age that is recorded for that testing period.

‡The figures given in the line labeled "N" indicate the number of pupils in each age group who were tested for this event.

Table 10

Percentiles for the Side Step for Girls According to the Number of Lines Crossed or Touched, Listed by Chronological Age

Percentile	Number of lines crossed or touched,* according to age†								
	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
99	25	22		25	23	24	24	24	24
95	18	19	20	20	20	21	21	21	21
90	16	17	19	19	–	–	20	20	20
85	15	–	18	–	–	19	19	19	19
80	–	16	–	18	18	18	18	–	–
75	–	–	17	–	–	–	–	18	18
70	14	15	–	17	17	17	17	–	–
65	–	–	16	–	–	–	–	17	17
60	13	14	–	–	–	–	–	–	–
55	–	–	–	16	16	–	16	16	16
50	–	–	15	–	–	16	–	–	–
45	12	13	–	15	15	15	15	–	–
40	–	–	14	–	–	–	–	15	15
35	–	12	–	–	–	–	–	–	–
30	11	–	13	14	14	14	14	–	–
25	–	11	–	–	–	–	–	14	14
20	10	10	12	13	13	13	13	13	13
15	9	9	11	12	12	12	–	–	–
10	7	8	10	11	11	11	12	12	12
5	5	7	8	9	10	10	10	11	10
N§	1060	1102	1148	1164	1115	1112	1145	1128	1089
Mean	12.9	13.6	15.6	15.8	15.8	16.0	16.0	16.3	16.2
Median	13.4	14.3	15.8	16.5	16.4	16.8	16.4	16.7	16.5
Q_1	11.3	11.8	13.3	14.3	14.4	14.6	14.4	14.7	14.7
Q_3	15.3	16.3	17.9	18.4	18.4	18.5	18.5	18.9	18.8
Standard deviation	5.1	4.5	7.2	4.1	3.5	3.6	4.0	3.2	3.5

*See page 52 for an explanation of the omission of the raw score.

†The age given means that the birthday for the year has been reached, but the next birthday has not been reached upon completion of the test. The pupil's age at the completion of the test is the age that is recorded for that testing period.

§The figures given in the line labeled "N" indicate the number of pupils in each age group who were tested for this event.

Table 11

Percentiles for the Pull-up for Girls According to the Number of Pull-ups Performed, Listed by Chronological Age

Percentile	Number of pull-ups, according to age*								
	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
99	37	36	20	30	28	26	14	6	11
95	8	5	4	4	4	4	2	2	2
90	3	3	3	2	2	1	1	1	1
85	2	2	2	1	1	–	–	0	–
80	1	1	1	–	–	0	0	–	0
75	–	–	–	0	0	–	–	–	–
70	0	0	0	–	–	–	–	–	–
65	–	–	–	–	–	–	–	–	–
60	–	–	–	–	–	–	–	–	–
55	–	–	–	–	–	–	–	–	–
50	–	–	–	–	–	–	–	–	–
45	–	–	–	–	–	–	–	–	–
40	–	–	–	–	–	–	–	–	–
35	–	–	–	–	–	–	–	–	–
30	–	–	–	–	–	–	–	–	–
25	–	–	–	–	–	–	–	–	–
20	–	–	–	–	–	–	–	–	–
15	–	–	–	–	–	–	–	–	–
10	–	–	–	–	–	–	–	–	–
5	–	–	–	–	–	–	–	–	–
N‡	1060	1102	1148	1164	1115	1112	1145	1128	1089
Mean	1.8	1.6	1.2	1.2	1.2	1.0	.7	.4	.6
Median	.8	.7	.7	.6	.6	.6	.6	.6	.6
Q_1	.4	.3	.3	.3	.3	.3	.3	.3	.3
Q_3	1.8	1.5	1.5	1.2	1.1	1.0	.9	.9	.9
Standard deviation	5.6	5.5	3.6	4.4	4.4	4.1	3.3	2.2	2.5

*The age given means that the birthday for the year has been reached, but the next birthday has not been reached upon completion of the test. The pupil's age at the completion of the test is the age that is recorded for that testing period.

‡The figures given in the line labeled "N" indicate the number of pupils in each age group who were tested for this event.

Table 12

Percentiles for the Jog-walk for Girls According to the Number of 110-yard Segments Completed, Listed by Chronological Age

Percentile	Number of 110-yard segments completed,* according to age‡								
	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17	Age 18
99									
95	18	19	16	14	14	14	13	13	13
90	13	15	13	13	13	13	12	12	12
85	12	13	–	–	–	12	–	–	–
80	–	12	12	12	12	–	–	11	11
75	11	–	–	–	–	–	11	–	–
70	–	–	–	–	–	11	–	–	–
65	–	11	11	–	11	–	–	–	–
60	–	–	–	11	–	–	–	–	10
55	10	–	–	–	–	–	10	10	–
50	–	10	–	–	–	–	–	–	–
45	–	–	10	–	–	10	–	–	–
40	–	–	–	10	10	–	–	–	–
35	9	9	–	–	–	–	9	9	9
30	–	–	9	–	–	–	–	–	–
25	–	–	–	9	–	9	–	–	–
20	8	8	–	–	9	–	–	–	8
15	7	7	8	8	–	–	8	8	–
10	4	6	7	–	8	8	7	7	7
5	0	0	3	6	7	7	6	5	4
N§	1060	1102	1148	1164	1115	1112	1145	1128	1089
Mean	10.0	10.6	10.7	10.7	10.8	10.6	10.0	9.8	9.7
Median	10.6	11.0	11.2	11.5	11.3	11.1	10.8	10.7	10.6
Q_1	9.2	9.4	9.8	10.1	10.1	10.0	9.5	9.4	9.3
Q_3	12.1	12.6	12.6	12.7	12.6	12.4	12.0	11.8	11.7
Standard deviation	5.0	4.8	4.0	3.0	2.8	3.2	2.6	2.9	2.9

*See page 52 for an explanation of the omission of the raw scores.

‡The age given means that the birthday for the year has been reached, but the next birthday has not been reached upon completion of the test. The pupil's age at the completion of the test is the age that is recorded for that testing period.

§The figures given in the line labeled "N" indicate the number of pupils in each age group who were tested for this event.

operated upon an areal-population scheme to achieve essentially the same result that the pupil-sampling process would have produced. As designed, each pupil enrolled in a California public school had theoretically an equal chance of entering the sample. The plan was not fully realized. It happened that, after the plan was approved and the project was underway, testing could not be accomplished in the Los Angeles Unified or San Francisco Unified school districts. The omission of these two major data sources had unknown effects on the validity of the data as a probability sample for all of California. In May, 1970, the decision was made to carry out the remainder of the testing according to the areal-representation scheme. Thus, the net sample fairly represents "California minus Los Angeles and San Francisco," but no one can certify it as a true probability sample for the whole state. There seems to be no conclusive evidence on the question of typicality of these two cities compared with the rest of the state.

Constraints in Formulating the Sampling Scheme

Several important constraints were assumed in formulating the sampling scheme. Among these were the following:

- The number of individuals in each age category was to be approximately 5,000 boys and 5,000 girls; thus, the total number (N) would be about 45,000 boys and 45,000 girls.
- The test events which were administered were as follows: standing long jump, knee bent sit-up for time (60 seonds), chair push-up (limited to 50), side step, pull-up, jog-walk, 50-yard dash, and 600-yard run-walk. The selection of these test events was the responsibility of the specialists in research and testing.
- Administrative considerations dictated that the test events be given by regular personnel in the school districts, not by visiting specialists. The ten area coordinators had the responsibility for providing detailed, specific instructions for the administration of each test event. Such instructions were made available in writing, demonstrations were given by showing a film, and procedures were discussed thoroughly with the personnel responsible for testing in each school.
- The sampling scheme had to be simple enough to be easily documented and realized from existing data sources at the California State Department of Education.
- Some empirical estimates of retest reliability were to be obtained as part of the sampling scheme. Also, each person who administered the test events was to complete a questionnaire regarding the testing experience.

Steps Taken in the Sampling Plan

The sampling plan was carried out as follows:

Step 1. The state was separated into statistical areas using the ten areas already established in the California Department of Education, as follows:

1. North Coast: Del Norte, Humboldt, Lake, and Mendocino counties
2. Sacramento Valley: Butte, Colusa, Glenn, Sacramento, Sutter, Tehama, Yolo, and Yuba counties
3. Sierra: Alpine, Amador, Calaveras, El Dorado, Inyo, Lassen, Mariposa, Modoc, Mono, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Trinity, and Tuolumne counties
4. San Francisco Bay: Alameda, Contra Costa, Marin, Napa, San Mateo, San Francisco, Santa Clara, Solano, and Sonoma counties
5. South Central Coast: Monterey, San Benito, San Luis Obispo, and Santa Cruz counties
6. San Joaquin Valley: Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare counties
7. South Coast: Santa Barbara and Ventura counties
8. Los Angeles: Los Angeles and Orange counties
9. San Diego: San Diego County
10. Southeast: Imperial, Riverside, and San Bernardino counties

Step 2. Each area was assigned a "factor A" multiplier according to the proportion of California school population realized in that area. Thus, Sacramento Valley, Area 2, represents 5.6 percent of the pupils, so factor A is .056 for that area; factor A for the San Francisco Bay Area, which represents 22.6 percent of the pupils, is .226, and so on for each of the ten statistical areas.

Factor A Multiplier Assigned and Total Number of Boys and Girls Tested in Each Age Group in Each Statistical Area

Statistical area	Factor A multiplier	Sample N (number)
1 North Coast	.011	55
2 Sacramento Valley	.056	280
3 Sierra	.023	115
4 San Francisco Bay	.226	1,130
5 South Central Coast	.024	120
6 San Joaquin Valley	.096	480
7 South Coast	.033	165
8 Los Angeles	.406	2,030
9 San Diego	.062	310
10 Southeast	.063	315
Total	1.000	5,000

Step 3. Each of the factor A numbers was multiplied by 5,000. This gave the number of pupils to be tested in each area for each age and sex. Thus, for Area 1, 5,000 X .011 equals 55 boys and 55 girls to be tested for each age, ten through eighteen; for Area 2, 5,000 X .056 equals 280 boys and 280 girls to be tested for each age, ten through eighteen, and so on for each of the ten areas. These products are shown in the column labeled "Sample N" on the preceding table; the total is 5,000. Thus, 55 pupils are needed from Area 1, 280 from Area 2, 1,130 pupils from Area 4, and so on. These same numbers of pupils will be required for each of the nine age levels and for each sex.

Step 4. Consequently, 55 boys and 55 girls for each of the nine ages are needed from Area 1, and these 110 pupils should be a probability sample from that area's total of the 90,000 pupils. The next stage of sampling allocates the counties' "portions" of this 55. There are four counties in Area 1 – Del Norte, Humboldt, Lake, and Mendocino. The counties' portions are represented by factor B. From the average daily attendance figures,[1] it appears that the following number of boys and girls for each of the nine ages should be selected from each county.

Total Number of Boys and Girls Tested in Each Age Group, as Determined by Factor B, for Each County in North Coast Area

County	Factor B	Sample N (number) (55 X factor B)
Del Norte	.099	5.5 = 6
Humboldt	.568	31.2 = 31
Lake	.075	4.1 = 4
Mendocino	.258	14.2 = 14
Total	1.000	55

Step 5. Next, the schools were identified from which the specified numbers (N) of pupils for each county were to be tested. Using the 1970 edition of the *California Public School Directory*,[2] the sample was taken according to enrollment totals. There are nine elementary schools and one high school in Del Norte County. Enrollments in the elementary schools vary from 96 to 703, with a median of about

[1] *The State School Fund and Educational Statistics for the Fiscal Year Ending June 30, 1967.* Sacramento: California State Department of Education, 1967.

[2] *California Public School Directory.* Sacramento: California State Department of Education, 1970.

300. The last digit in enrollment was dropped, and the schools were listed according to the enrollments by tens as follows:

List of Elementary Schools in Del Norte County, with Abbreviated Enrollment Figures and Random Numbers

School	Abbreviated enrollment figure	Random numbers
Maxwell	31	001-031
Crescent Elk	70	032-101
Joe Hamilton	48	102-149
Lake Earl	15	150-164
Margaret Keating	26	165-190
Mountain	10	191-200
Pine Grove	35	201-235
Redwood	34	236-269
Smith River	30	270-299

Step 6. A table of random numbers was consulted, and starting from a random page, the statistician shut his eyes and, with a pencil, jabbed a number on that page column. He continued down the column until a three digit number ranging from 001 to 299 was encountered. Using the number table in Deming's *Some Theory of Sampling*[3] and starting with number 315 (located eleventh from the bottom in Column II), the first relevant number encountered was 173. Thus, Margaret Keating Elementary School (with numbers from 165 to 190) was designated the elementary school for Del Norte County. One class or more as necessary was requested from each grade, five through eight, at Keating Elementary School. Permission was requested from the superintendent of Del Norte County Unified School District to permit the teachers and pupils of Keating Elementary School and Del Norte High School (since there is only one high school in the county) to participate in the experimental testing project. Directions were given for classes (as many classes as necessary to obtain the sample) to be selected beginning at the start of the school day at the Keating school in which 26 boys and 26 girls of each age, ten through thirteen, were enrolled and could be tested. The same directions were given to personnel at Del Norte High School. Thus, the random selection was conducted by the area coordinator and personnel in each school in each statistical area throughout the state.

Changes in the Sampling Procedure

The original number for each age for boys and for girls in the sampling plan was 5,000. Because time became a vital factor in the

[3]Deming, W. E., *Some Theory of Sampling.* New York: Wiley, John & Sons, Inc., 1950, page 593.

actual administration of the test events in completing the testing in May, 1970, the statistician, research specialists, and area coordinators agreed to test one-half the number of boys and girls designated for each school. Thus, the original number (N) of 5,000 boys and 5,000 girls was reduced to 2,500 boys and 2,500 girls in each age category.

The sample of 2,500 for each sex, ages ten through eighteen, was again reduced because some scoring forms were incomplete, improperly marked, or torn. Because of the proportionalizing in each age and sex sample, more cases had to be thrown out in some age groups than in others. Consequently, the data finally tabulated were reduced from 2,500 boys and 2,500 girls to a range of 1,069 to 1,277 for boys and a range of 1,060 to 1,164 for girls. In addition, for unforeseen administrative reasons, it was impossible to test pupils in Los Angeles Unified and San Francisco Unified school districts. So the final sample represents a probability sample of California minus Los Angeles and San Francisco, and no strict claim can be made that California "in toto" is represented. The proportions in the statistical geographical areas, besides those containing Los Angeles and San Francisco, were well maintained, however.

Availability of Additional Information

Linear correlations between all eight scores of the test events with each other score (a total of 28 correlation coefficients for each age and sex grouping) were also computed. These results, which are not included in this report, appear in a series of 18 correlation matrices that can be obtained from the Bureau of Health Education, Physical Education, Athletics, and Recreation, State Department of Education, 721 Capitol Mall, Sacramento, CA 95814. The retest reliability tabulation was being performed during the 1970-71 school year and was not available for printing in this publication.

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